

**XCEL ENERGY  
APPLICATION TO THE  
MINNESOTA ENVIRONMENTAL QUALITY BOARD  
FOR ROUTE PERMITS**

**SPLIT ROCK SUBSTATION TO NOBLES COUNTY  
SUBSTATION TO LAKEFIELD JUNCTION  
SUBSTATION 345 kV TRANSMISSION LINE  
AND THE  
NOBLES COUNTY SUBSTATION TO  
CHANARAMBIE SUBSTATION 115 KV  
TRANSMISSION LINE  
AND THE NOBLES COUNTY  
SUBSTATION**

**April 30, 2004**

**MEQB DOCKET NO. 03-73-TR-XCEL**



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**List of Acronyms and Abbreviations**

AMSL	above mean sea level
BCE	before common era
BMP	best management practice
BPA	Bonneville Power Administration
CON	Certificate of Need
CWI	Minnesota County Well Index
dB	Decibels
dBA	A-weighted sound level recorded in units of decibels
DNR	Minnesota Department of Natural Resources
EA	Environmental Assessment
ECS	Ecological Classification System
EMF	electromagnetic field
EPA	United States Environmental Protection Agency
EQB	Minnesota Environmental Quality Board
G	Gauss
GFP	South Dakota Game Fish and Parks
HVTL	high voltage transmission line
Hz	Hertz
JMU	Jackson Municipal Utilities
kV	Kilovolt
MDH	Minnesota Department of Health
mg/L	milligrams per liter – equivalent to parts per million (ppm)
MN/DOT	Minnesota Department of Transportation
MnSP	Minnesota Soybean Processors
MPCA	Minnesota Pollution Control Agency
MW	megawatts
NAC	noise area classification
NESC	National Electrical Safety Code
NEV	neutral-to-earth voltage
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollution Discharge Elimination System
NRCS	National Resources Conservation Service
NWI	National Wetlands Inventory
PEBC	Prairie Ecology Bus Center
ppm	parts per million

PUC	Public Utilities Commission
PWI	Public Waters Inventory
ROW	Right-of-way
SFD	swan flight diverter
SHPO	State Historic Preservation Office
SNA	Scientific and Natural Area
SWPPP	Storm Water Pollution Prevention Plan
TLE	temporary limited easements
USDOE	United States Department of Energy
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WPA	Waterfowl Production Area
WMA	Wildlife Management Area

## 1.0 EXECUTIVE SUMMARY

### 1.1 PROPOSAL SUMMARY

Northern States Power Company, d/b/a Xcel Energy, submits this application for a route permit from the Minnesota Environmental Quality Board (EQB) pursuant to Minnesota Rules Chapter 4400 and Minnesota Statutes Chapter 116C. The need for this project has been established by the Public Utilities Commission (PUC or Commission) in its March 11, 2003 *Order Granting Certificates of Need Subject to Conditions* (PUC Docket No. E-002/CN-01-1958), which is described in more detail in Section 2.3. The particular facilities for which the permit is being requested (the Project) include:

- ◆ A new 345 kilovolt (kV) line from the Lakefield Junction Substation to the Split Rock Substation in South Dakota,
- ◆ A new 345-115-34.5 kV substation to be located in Nobles County (“Nobles County Substation”), and
- ◆ A new 115 kV line from the new Nobles County Substation to the existing Chanarambie Substation.

In the future, Xcel Energy also plans to build a new substation called Fenton which was discussed as part of the CON process. The Fenton substation will be located about midpoint on the Nobles to Chanarambie 115 kV line. Xcel Energy is coordinating with the large and small wind developers on the siting of this substation and final agreements are not complete at this time. The Fenton substation will be permitted separately (either locally or through the EQB) once the final siting issues are completed later this year.

Depending on the final route, the 345 kV transmission line will be between 86 and 88 miles long and will extend from the Split Rock Substation east of Sioux Falls, South Dakota to the Lakefield Junction Substation east of Lakefield, Minnesota. The 115 kV transmission line will also vary slightly in length depending on the final route. The route begins at the new Nobles County Substation, which will be located northwest of Worthington. The route will extend northwest toward the Chanarambie Substation for approximately 36 to 40 miles.

### 1.2 COMPLETENESS CHECKLIST

The contents required for an application with the EQB under the Full Permitting Process are outlined in Minnesota Rules 4400.1150. The EQB submittal requirements are listed on Table 1 with cross-references indicating where the information can be found in this application.

**TABLE 1  
COMPLETENESS CHECKLIST**

Authority	Required Information	Where
4400.1150, Subp. 2	Site Permit for LEPGP	
A.	a statement of proposed ownership of the facility at the time of filing the application and after commercial operation	2.1
B.	the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated	2.2
C.	at least two proposed routes for the proposed high voltage transmission line and identification of the applicant's preferred route and the reasons for the preference	4.4.1, 4.5.1, 4.6, 5.1, 5.2, 5.10, 6.1, 6.3, 6.4.1, 6.5
D.	a description of the proposed high voltage transmission line and all associated facilities including the size and type of the high voltage transmission line	3.1, 3.4
E.	the environmental information required under 4400.1150, Subp. 3	See 4400.1150, Subp.3(A)-(H) Below
F.	identification of land uses and environmental conditions along the proposed routes	4.4.3.2, 4.4.2, 4.5.3.2, 4.5.2, 5.3, 5.4.2, 6.3.3.2, 6.3.2, 6.4.2, 6.4.2.2
G.	the names of each owner whose property is within any of the proposed routes for the high voltage transmission line	7.2.3, Appendix L
H.	United States Geological Survey topographical maps or other maps acceptable to the chair showing the entire length of the high voltage transmission line on all proposed routes	Appendix B, C, D
I.	identification of existing utility and public rights-of-way along or parallel to the proposed routes that have the potential to share right-of-way with the proposed line	3.2, Appendix B, C, D
J.	the engineering and operational design concepts for the proposed high voltage transmission line, including information on the electric and magnetic fields of the transmission line	3.1, 3.4, 3.5
K.	cost analysis of each route, including the costs of constructing, operating, and maintaining the high voltage transmission line that are dependent on design and route	2.7
L.	a description of possible design options to accommodate expansion of the high voltage transmission line in the future	3.1.2

Authority	Required Information	Where
M.	the procedures and practices proposed for the acquisition and restoration of the right-of-way, construction, and maintenance of the high voltage transmission line	3.3, 3.4.6
N.	a listing and brief description of federal, state, and local permits that may be required for the proposed high voltage transmission line	7.3
O.	a copy of the Certificate of Need or the certified HVTL list containing the proposed high voltage transmission line or documentation that an application for a Certificate of Need has been submitted or is not required	Appendix A
<b>4400.1150, Subp. 3</b>	<b>Environmental Information</b>	
A.	a description of the environmental setting for each site or route	4.4.2, 4.5.2, 5.3, 6.3.2, 6.4.2
B.	a description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation, and public services	4.4.3, 4.5.3, 5.4, 6.3.3, 6.4.3
C.	a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining	4.4.4, 4.5.4, 5.5, 6.3.4, 6.4.4
D.	a description of the effects of the facility on archaeological and historic resources	4.4.5, 4.5.5, 5.6, 6.3.5, 6.4.5
E.	a description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna	4.4.6, 4.5.6, 5.7, 6.3.6, 6.4.6
F.	a description of the effects of the facility on rare and unique natural resources	4.4.7, 4.5.7, 5.8, 6.3.7, 6.4.7
G.	identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route	4.4.8, 4.5.8, 5.9, 6.3.8, 6.4.8
H.	a description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G and the estimated costs of such mitigative measures	4.4.3-4.4.8, 4.5.3-4.5.8, 5.4-5.8, 6.3.3-6.3.8, 6.4.3-6.4.8 ("Impacts and Mitigation")
<b>4400.1350</b>	<b>Notice of Project</b>	
Subpart 2	Notification to persons on general list, to local officials, and to property owners	Will be submitted within 15 days of application submission

Authority	Required Information	Where
4400.3150	<b>Factors Considered</b>	
A.	effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services	4.6, 5.10, 6.5
B.	effects on public health and safety	4.6, 5.10, 6.5
C.	effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining	4.6, 5.10, 6.5
D.	effects on archaeological and historic resources	4.6, 5.10, 6.5
E.	effects on the natural environment, including effects on air and water quality resources and flora and fauna	4.6, 5.10, 6.5
F.	effects on rare and unique natural resources	4.6, 5.10, 6.5
G.	application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity	4.6, 5.10, 6.5
H.	use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries	4.6, 5.10, 6.5
I.	use of existing large electric power generating plant sites	4.6, 5.10, 6.5
J.	use of existing transportation, pipeline, and electrical transmission systems or rights-of-way	4.6, 5.10, 6.5
K.	electrical system reliability	4.6, 5.10, 6.5
L.	costs of constructing, operating, and maintaining the facility which are dependent on design and route	4.6, 5.10, 6.5
M.	adverse human and natural environmental effects which cannot be avoided	4.6, 5.10, 6.5
N.	irreversible and irretrievable commitments of resources	4.6, 5.10, 6.5
4400.3350	<b>Wilderness Areas</b>	
Subpart 1	No high voltage transmission line may be routed through state or national wilderness areas	Not Applicable

Authority	Required Information	Where
4400.3350	<b>Parks and Natural Areas</b>	
Subpart 2	No high voltage transmission line may be routed through state or national parks or state scientific and natural areas unless the transmission line would not materially damage or impair the purpose for which the area was designated and no feasible and prudent alternative exists. Economic considerations alone do not justify use of these areas for a high voltage transmission line	Not Applicable
<b>Minn. Stat. §116C.57, Subd. 4</b>	<b>Considerations in Designating Sites and Routes</b>	
(1)	Evaluation of research and investigations relating to the effects on land, water and air resources of large electric power generating plants and high voltage transmission lines and the effects of water and air discharges and electric and magnetic fields resulting from such facilities on public health and welfare, vegetation, animals, materials and aesthetic values, including base line studies, predictive modeling, and evaluation of new or improved methods for minimizing adverse impacts of water and air discharges and other matters pertaining to the effects of power plants on the water and air environment	3.5, 4.4, 4.5, 4.6, 5.0, 5.10, 6.3, 6.4, 6.5
(2)	Environmental evaluation of sites and routes proposed for future development and expansion and their relationship to the land, water, air and human resources of the state	3.1.2, Chapters 4, 5, and 6
(3)	Evaluation of the effects of new electric power generation and transmission technologies and systems related to power plants designed to minimize adverse environmental effects	Not Applicable
(4)	Evaluation of the potential for beneficial uses of waste energy from proposed large electric power generating plants	Not Applicable
(5)	Analysis of the direct and indirect economic impact of proposed sites and routes including, but not limited to, productive agricultural land lost or impaired	4.4.3.6, 4.4.4, 4.5.4, 4.6, 5.4.6, 5.5, 5.10, 6.3.3.6, 6.3.4, 6.4.3.6, 6.4.4., 6.5
(6)	Evaluation of adverse direct and indirect environmental effects that cannot be avoided should the proposed site and route be accepted	4.4.8, 4.5.8, 4.6, 5.9, 5.10, 6.3.8, 6.4.8, 6.5
(7)	Evaluation of alternatives to the applicant's proposed site or route proposed pursuant to subdivisions 1 and 2	Chapters 4, 5 and 6
(8)	Evaluation of potential routes that would use or parallel existing railroad and highway rights-of way	3.2, 4.6, 5.10, 6.5

Authority	Required Information	Where
(9)	Evaluation of governmental survey lines and other natural division lines of agricultural land so as to minimize interference with agricultural operations	4.4.4.1, 4.4.4.5, 4.5.1, 4.5.4.1, 4.5.4.5, 4.6, 5.5.1, 5.5.5, 5.10, 6.3.4.1, 6.3.4.5, 6.4.4.1, 6.4.4.5, 6.5
(10)	Evaluation of the future needs for additional high voltage transmission lines in the same general area as any proposed route, and the advisability of ordering the construction of structures capable of expansion in transmission capacity through multiple circuiting or design modifications	3.1.2, 4.6, 5.10, 6.5
(11)	Evaluation of irreversible and irretrievable commitments of resources should the proposed site or route be approved	4.6, 5.10, 6.5
(12)	When appropriate, consideration of problems raised by other state and federal agencies and local entities	7.1

## 2.0 INTRODUCTION

### 2.1 STATEMENT OF OWNERSHIP OF THE PROPOSAL

Xcel Energy is headquartered in Minneapolis, Minnesota. Xcel Energy is a wholly owned subsidiary of Xcel Energy, Inc., the fourth-largest combination electricity and natural gas energy company in the United States. Xcel Energy, Inc. provides a comprehensive portfolio of energy-related products and services to 3.2 million electricity customers and 1.7 million natural gas customers through its regulated operating companies in Colorado, Kansas, Michigan, Minnesota, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Wisconsin and Wyoming. Xcel Energy owns over 240,000 circuit miles of electricity transmission and distribution lines and more than 32,700 miles of natural gas pipelines, and operates regulated power plants that generate about 15,246 megawatts (MW) of electric power. Xcel Energy provides electricity services to approximately 1.2 million customers and natural gas services to 400,000 residential, commercial and industrial customers in Minnesota. We also provide electricity service to over 73,000 customers in South Dakota. Xcel Energy serves some portions of the area that this project covers, while the rest of the customers are served by local cooperatives and Alliant Energy. Great River Energy, Alliant Energy, Western Area Power Administration and Xcel Energy own the major transmission lines in this area and jointly operate the system through the Midwest Independent System Operator.

The Split Rock and Chanarambie Substations are owned and operated by Xcel Energy. The existing Lakefield Junction Substation is owned and operated by Alliant Energy. Xcel Energy will pay for the construction. Xcel Energy will construct, own and operate the new 345 kV and 115 kV transmission lines and the new Nobles County Substation. There are several route segments where the new Xcel Energy lines would double circuit with other utilities' transmission lines. If any of these are chosen by the EQB as part of the final routes, Xcel Energy will work with these companies to establish ownership and operation standards for those segments. Alliant Energy is the primary utility that is impacted by this project and is aware of the proposal. Xcel Energy is the permittee for all portions of this Project since the Company is paying for the transmission line, structures, new substation equipment and the substation improvements.

## 2.2 PERMITTEE / PROJECT MANAGER

The permittee for the proposed project is:

**Permittee:** Northern States Power Company, a Minnesota Corporation d/b/a Xcel Energy  
414 Nicollet Mall  
Minneapolis, Minnesota 55401

**Contacts:** Pamela J. Rasmussen  
Permitting Analyst

**Address:** P.O. Box 8  
Eau Claire, WI 54702-0008

**Phone:** (715) 839-4661

**Fax:** (715) 839-2480

**Email:** pamela.jo.rasmussen@xcelenergy.com

## 2.3 CERTIFICATE OF NEED PROCESS SUMMARY

The transmission system in and around Buffalo Ridge currently has authorized generator outlet capability of approximately 260 megawatts (MW) and is fully subscribed. More transmission capacity is needed to allow for increased wind generation in that region. To address this need, Xcel Energy filed an application with the PUC on December 28, 2001 for certificates of need to construct four new HVTLs in southwestern Minnesota. The PUC directed the Office of Administrative Hearings to conduct public and technical hearings on the CON application, which were held in May, June and July of 2002 in Worthington, Pipestone, Redwood Falls and Saint Paul.

In its CON application, Xcel Energy proposed several alternative transmission projects to improve the outlet capacity to approximately 825 MW. Each plan consisted of a sequence of projects ranging from the upgrade of existing transmission lines, to the replacement of substation transformers, the rebuild of existing transmission lines and new transmission line additions to the system. Several other system solutions were explored in the Xcel Energy's engineering studies, presented as Appendix 2 of the CON Application, but were not presented as alternatives due to their expense or poor performance.

The four alternatives which were offered by Xcel Energy in its CON Application and considered during the hearings are as follows:

- ◆ **The 345 kV Plan:** This option relied on improvements in and ties to the higher voltage regional transmission system which operates at 345 kV. The principal components of the plan were the Fox Lake-Lakefield Junction 161 kV line, a 345 kV transmission line between Lakefield Junction Substation near Lakefield, Minnesota and Split Rock Substation near Sioux Falls South Dakota, a 115 kV line between a new Nobles County Substation to be located on the Lakefield Junction-Split Rock 345 kV line and a new Fenton Substation to be located in the vicinity of Fenton Township and the Chanarambie Substation near Lake Wilson on Buffalo Ridge; and a second Fenton Substation to Chanarambie 115 kV line.
- ◆ **The 115/161kV Plan:** This option was designed to establish stronger Buffalo Ridge ties to the existing 115 kV and 161 kV system serving southwestern Minnesota. The principal components of the plan were the Fox Lake-Lakefield Junction 161 kV line, the Lyon County-Franklin 115 kV transmission line, a 115 kV line from Buffalo Ridge Substation near Lake Benton, Minnesota to White Substation near Brookings South Dakota, and a 161 kV line from Chanarambie Substation near Lake Wilson, Minnesota, to Heron Lake Substation near Heron Lake, Minnesota.
- ◆ **The 115 kV Plan:** This option relied on the addition of new transmission infrastructure primarily at the 115 kV level. The principal components were the Fox Lake-Lakefield Junction 161 kV line, a 115 kV line from Lyon County Substation near Marshall, Minnesota to Franklin Substation near Franklin, Minnesota, and a 115 kV transmission line from Franklin Substation to Fort Ridgely Substation near New Ulm.
- ◆ **The Reconductor Plan:** This option relied on the upgrade and rebuilding of existing elements of the transmission system as much as possible. It consisted of various upgrade and rebuild projects dispersed primarily throughout western and southwestern Minnesota. The plan included the Fox Lake-Lakefield Junction 161 kV transmission line.

Additionally, in accordance with Minn. R. 7849.0260 (B), Subp. 7, Xcel Energy presented information on an underground alternative. Transmission lines can be placed underground but at substantial additional expense compared to overhead construction. For example, placing a 345 kV transmission line underground costs 10 times as much as building overhead. Because of the significantly greater expense associated with underground transmission construction, the use of underground technology is limited to locations where the impacts of overhead construction are completely unacceptable or where physical circumstances allow for no other option. Xcel Energy concluded that the environmental and land use setting did not warrant underground construction on any of the four lines.

During the hearings, which were conducted by an administrative law judge (ALJ), Xcel Energy presented a fifth alternative, known as Option 1H. Option 1H was substantially the same as the 345 kV Plan except that it incorporated the Buffalo Ridge-White 115 kV line instead of the second Nobles County-Fenton 115 kV circuit. The focus of the CON hearings was on Option 1H and the 115/161 kV Plan. No party presented any evidence at hearing for, or advocated for, an underground option.

By recommendation dated November 8, 2002, the ALJ found that Xcel Energy had demonstrated the need for additional outlet capability on the Buffalo Ridge. On March 11, 2003, the Commission likewise concluded that Xcel Energy had demonstrated the need for transmission facilities to move 825 MW of wind generation from Buffalo Ridge. A copy of the CON order is included as Appendix A. The PUC further determined that Option 1H was the most reasonable and prudent option for satisfying the need and granted CONs for the Company to build the four new lines:

- ◆ A new 161 kV transmission line connecting Lakefield Junction-Fox Lake;
- ◆ A new 345 kV transmission line connecting Lakefield Junction to Split Rock in South Dakota;
- ◆ A new 115 kV transmission line connecting a new Nobles County Substation, located on the Lakefield Junction-Split Rock 345 kV line, with a new “Fenton Substation” and the existing Chanarambie Substation on Buffalo Ridge; and
- ◆ A new 115 kV transmission line connecting the Buffalo Ridge Substation with the White Substation in Lincoln County and South Dakota.

By granting CONs for these four new lines, the PUC decided the appropriate system configuration to meet the demonstrated need that limited the issues for consideration in this routing process. Minnesota law provides that once the CON process has been completed and a CON has been issued, the EQB routing process cannot consider issues of size, type and timing of facilities or the no build option. The Minnesota State Legislature has determined that these issues are to be finally decided by the PUC. Minn. Stat. § 116C.53, Subd. 2 provides that the EQB may not consider size, type, timing, alternative system configurations and voltage once the CON is issued. This limitation is reflected in the EQB’s rules. Minn. R. 4400.1700, Subp. 5 provides that the EIS “shall not address questions of need, including size, type, and timing; questions of alternative system configurations; or questions of voltage.” Similarly, Minn. R. 4400.3250 provides that when a certificate of need has been granted, the EQB is not to consider “questions of need, including size, type, and timing, questions of alternative system

configurations, and questions of voltage” when determining whether to issue a permit. Accordingly, in this routing proceeding, the EQB will determine the best route for the PUC-approved facilities: a new 115 kV line from Chanarambie County Substation to the Nobles County Substation and new 345 kV line from the Lakefield Junction Substation to the Split Rock Substation. Alternative system configurations will not be considered.

## **2.4 PROJECT LOCATION**

Xcel Energy is proposing two new transmission lines, each with two proposed route alternatives. The Project will be located in Jackson, Murray, Nobles, and Rock Counties in Minnesota and Minnehaha County in South Dakota (Figure 1). Table 2 outlines the locations of the proposed corridors for the transmission lines.

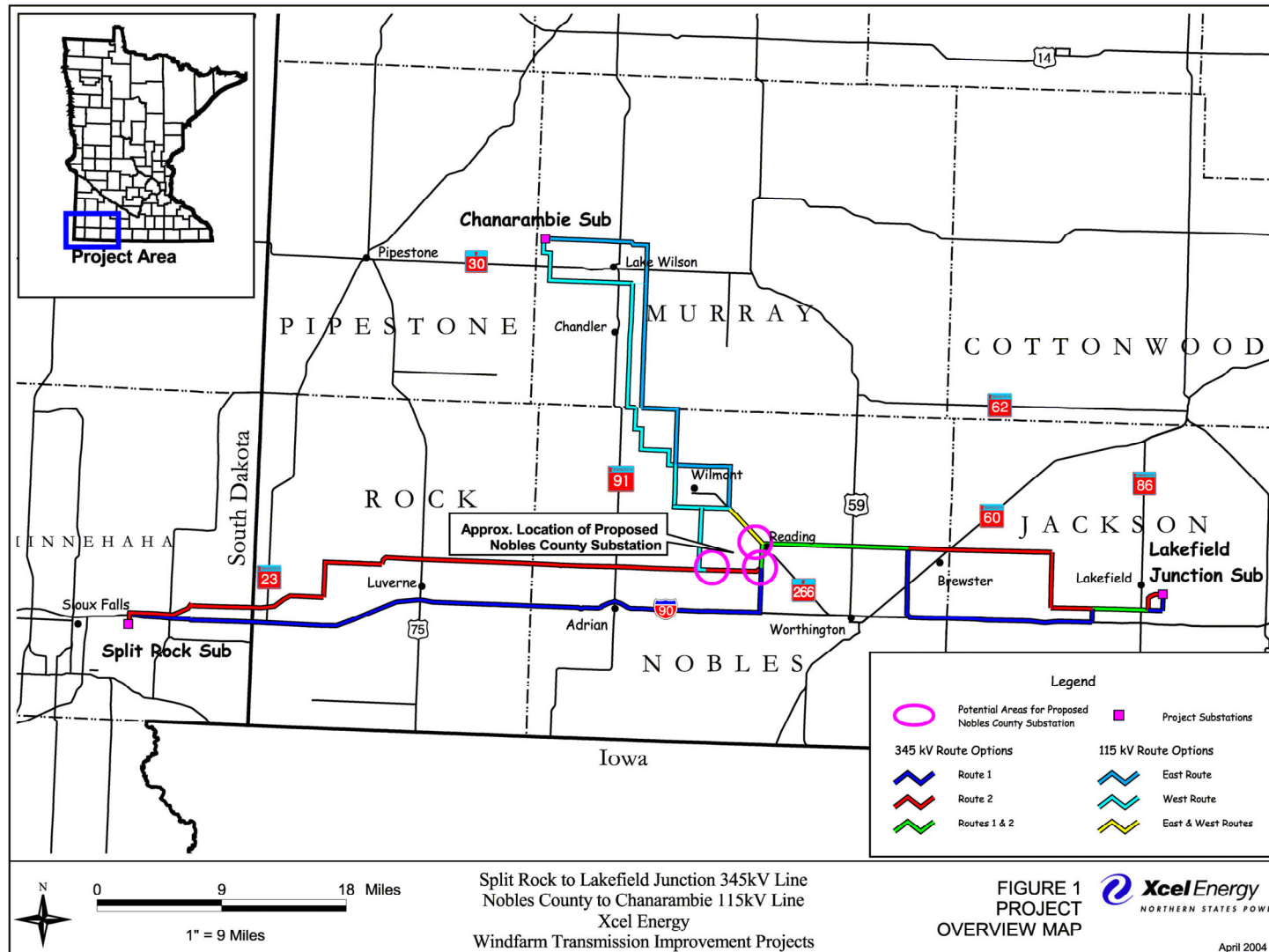
## **2.5 PROJECT PROPOSAL**

The proposed project will help support the development of wind energy in southwest Minnesota and southeast South Dakota. Figure 1 identifies the project location and proposed routes and substation locations described in this application.

The new Lakefield Junction to Split Rock 345 kV transmission line will include a new transmission line from the Split Rock Substation near Sioux Falls, SD to the Lakefield Junction Substation near Lakefield, MN (Figure 1). Approximately 90 percent of the new 345 kV transmission line will be in Minnesota. The right-of-way for the 345 kV line will be 150 feet wide for any cross country sections, and 80 feet wide if it parallels existing transmission lines or roads. Structures will be single steel poles with a height of 120 to 140 feet. On average, the transmission line will span 950 feet between structures.

Minn.Rules, 4400.0200, subp. 16 states that a route may have a variable width of up to 1.25 miles within which a right-of-way for a high voltage transmission line can be located. Xcel Energy requests the EQB approve a narrower corridor 660-foot wide from the centerline of the 345 kV route. This width should be sufficient to account for any possible routing issues that may occur along any of the proposed routes. Two routes for the 345 kV transmission line have been identified (Appendix B):

**FIGURE 1 PROJECT OVERVIEW MAP**



**TABLE 2**  
**PROPOSED TRANSMISSION LINE LOCATIONS**

State	County	Township	Range	Sections
Minnesota	Jackson	102	36	3, 7-10, 15-18
			37	5, 8-18
			38	13-18
		103	37	19-20, 29, 32
			38	19-24
	Murray	105	42	4-9, 16-21, 28-35
		106	42	4-6, 8, 9, 16-21, 28-33
			43	1-6, 13-18
		107	42	31, 33
			43	31-36
	Nobles	102	39	3, 4, 9, 10, 13-16
			41	2, 6, 7, 11, 14-18
			42	13-18
			43	13-18
		103	39	19-24, 27-34
			40	19-36
			41	4-10, 14-16, 18, 19, 22-26, 31-36
			42	1-3, 10-13, 24, 25, 36
			43	31-36
		104	41	28-30, 32, 33
			42	2-8, 10, 11, 14-17, 20-27, 34, 35
	Rock	102	44	13-18
			45	13-18, 19-21
			46	1-4, 9, 10, 15-18, 23-30
			47	23-26
		103	44	31-36
			45	31-36
			46	33-36
South Dakota	Minnehaha	102	47	19-22, 27-30
			48	23-32

- ◆ Route 1 (“Interstate Route”): This 88-mile route will generally parallel Interstate 90 (I-90) and will deviate north from the highway near the city of Worthington to connect with the new Nobles County Substation and avoid the Worthington airport. The route continues east from the chosen substation location to the Lakefield Junction Substation, east of Lakefield. This route option will cost approximately \$50 million.
- ◆ Route 2 (“Alliant Route”): This 86-mile route will primarily double circuit sections of the existing Xcel Energy and Alliant Energy 161 kV transmission lines, beginning just north of the Split Rock Substation. However, it will also require some new ROW that is not along an existing corridor. New ROW is required because it is not feasible to follow the entire existing 161 kV route to connect Split Rock and Lakefield Junction Substations. This route option will cost approximately \$58 million.

The Interstate Route is the route preferred by Xcel Energy. A detailed description of why this route is preferred is in Section 4.6.

The new Nobles County Substation will be constructed near Reading, MN. Xcel Energy has identified three general areas where the substation could be located. These three locations are shown in Appendix C and are designated as Substation A, Substation B and Substation C. The substation will occupy approximately fifteen acres and will be designed to accommodate the 115 kV and 345 kV transmission lines identified in this application. Xcel Energy plans to acquire a substation site that would be a minimum of 40 acres. Specific sites will be identified as the permitting process moves forward. Several landowners have expressed interest in selling land for the substation. While all three sites proposed in the route application are acceptable to Xcel Energy, however; the Company prefers Substation Site A. The reasons for this preference are described in greater detail in Section 5.10.

The Nobles County to Chanarambie 115 kV transmission line will include the construction of approximately 36 to 40 miles of new transmission line from the new Nobles County Substation to the existing Chanarambie Substation near Lake Wilson, MN (Appendix D). This entire route is within the state of Minnesota. The right-of-way for the new 115 kV transmission line will be 75 feet wide cross-country, and 42.5 feet wide if it parallels existing transmission lines or roads. Structures will be single pole structures similar to other poles in the project vicinity. The poles will be 70 to 80 feet in height and will have an average span of 400 feet between structures. Similar to the 345 kV transmission line, Xcel Energy is requesting a 660-foot corridor from the centerline of the 115 kV route. A wider corridor of 6,600 feet is being requested near the

Chanarambie substation to address issues with congestion in the area. The congestion has been caused by the infrastructure associated with the wind development in the area. This width should be sufficient to account for any reasonable routing issues that could arise in this area. Two route alternatives routes have been identified for the 115 kV transmission line, which are identified as the West Route and the East Route. These routes will generally follow county and township roads northwest from the new Nobles County Substation to the existing Chanarambie Substation. Xcel Energy believes both routes are acceptable, but prefers the East Route. The reasons for this preference are set forth in Section 6.5.

Figure 2 identifies the overall preferred route and substation site for the Project.

## 2.6 PROJECT SCHEDULE

Xcel Energy proposes an in-service date of August 2007 for both the 345 kV route and the 115 kV route. A permitting and construction schedule for the Split Rock Substation to Lakefield Junction Substation 345 kV transmission line summary is provided below:

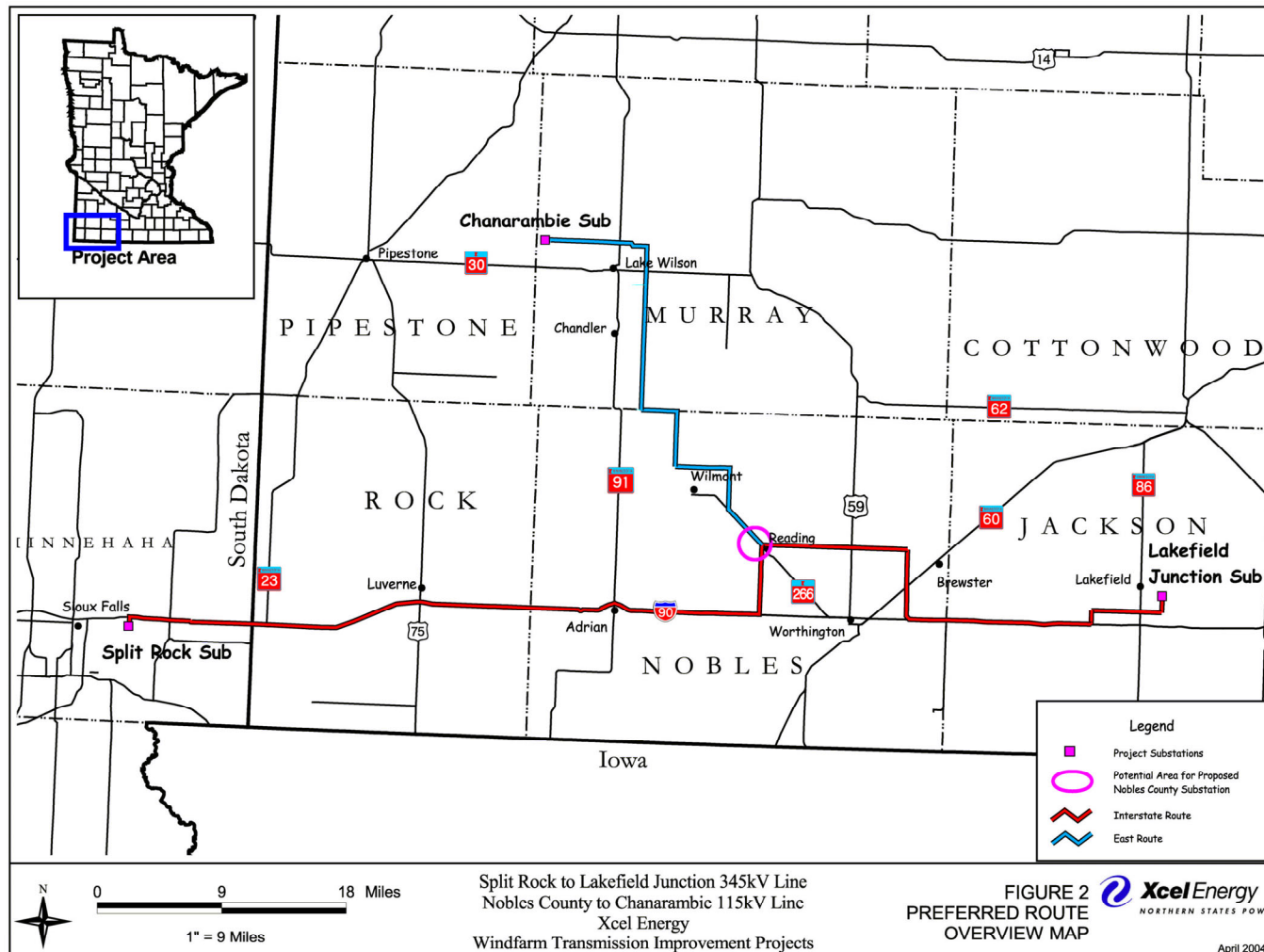
Submit EQB Route Permit Application	April 30, 2004
EQB Review Process Complete	April 2005
Survey Permission and Survey	April 2005 to June 2005
Line and Substation Design	May 2005 to October 2005
ROW Acquisition	September 2005 to January 2006
Transmission Line and Substation Construction	April 2006 to August 2007
Final ROW Contacts, Damage Settlements & Cleanup	August 2007 to October 2007

If the Alliant Route is chosen for the 345 kV route, the in-service date proposed above could not be met, and would be delayed to at least 2008. The delayed in-service date is due to the need of keeping the existing Alliant line in operation between May 15 and October 15. Please see Section 4.6 for more detail on this issue and Section 4.5.3.10 for a discussion of the socioeconomic impacts associated with this delay.

A permitting and construction schedule for the Nobles County Substation to Chanarambie Substation 115 kV transmission line summary is provided below:

Submit EQB Route Permit Application	April 30, 2004
EQB Review Process Complete	April 2005
Survey Permission & Survey	April 2005 to May 2005
Line & Substation Design	May 2005 to September 2005

**FIGURE 2  
PREFERRED ROUTE AND SUBSTATION SITE FOR THE PROJECT**



ROW Acquisition

August 2005 to January 2006

Transmission Line &amp; Substation Construction

June 2006 to August 2007

Final ROW Contacts, Damage Settlements &amp; Cleanup

December 2007 to March 2008

## 2.7 PROJECT COSTS

The project costs for the Preferred Route are estimated at \$85,670,000 million. The total cost of this option is less than the alternatives. This is primarily due to the added costs of the Alliant Route double circuit transmission line and the cost for the removal of the existing structures. The Interstate Route is approximately \$8.5 million less than the Alliant Route, whereas the difference between the East and West Routes is approximately \$2 million. Table 3 provides a breakdown of the project transmission and substation costs.

**TABLE 3  
PROJECT COSTS**

### Transmission Line Construction

Route	Transmission Line Costs	ROW Costs	Pole Removal Costs	Total Cost
Interstate Route to Substations A or B	\$46,040,000	\$3,670,000	N/A	\$49,710,000
Interstate Route to Substation C	\$47,570,000	\$3,660,000	N/A	\$51,230,000
Alliant Route to All Substations	\$53,060,000	\$3,510,000	\$1,660,000	\$58,230,000
West Route to Substations A or B	\$14,610,000	\$850,000	N/A	\$15,460,000
West Route to Substation C	\$13,250,000	\$840,000	N/A	\$14,100,000
East Route to Substations A or B	\$12,830,000	\$620,000	N/A	\$13,450,000

### Substation Modifications

Location	Costs
Split Rock Substation Modifications	\$2,500,000
Lakefield Junction Substation Modifications	\$1,260,000
Chanarambie Substation Modifications	\$750,000

### Substation Construction

Location	Costs
Nobles County Substation	\$18,000,000

Transmission line costs include items related to engineering, surveying, materials, labor and equipment. Costs for ROW are estimated costs associated with the acquisition of ROW, and include expenses and labor. These costs do not include any costs related to restoration or mitigation.

Operating and maintenance costs for the transmission line will be nominal for several years since the line will be new and there is minimal vegetation maintenance required. Annual operating and maintenance costs for the 345 kV transmission voltages across Xcel Energy's Upper Midwest system have averaged \$1,000 per mile of transmission ROW over the last five years. Maintenance costs for the 115 kV transmission voltages have averaged \$500 per mile of transmission ROW within the same time period. The principal operating and maintenance cost will be inspections, usually done by fixed wing aircraft on a monthly basis and by helicopter with infrared equipment once a year.

Xcel Energy performs periodic inspections of substations and equipment. The type and frequency of inspection varies depending on the type of equipment. Typical inspection intervals are semi-annually or annually. Maintenance and repair are performed on an as-needed basis, and therefore the cost varies from substation to substation.

### **3.0 ENGINEERING DESIGN, CONSTRUCTION AND RIGHT-OF-WAY ACQUISITION**

#### **3.1 TRANSMISSION LINE ENGINEERING AND OPERATIONAL DESIGN**

##### **3.1.1 TRANSMISSION STRUCTURES AND ROW DESIGN**

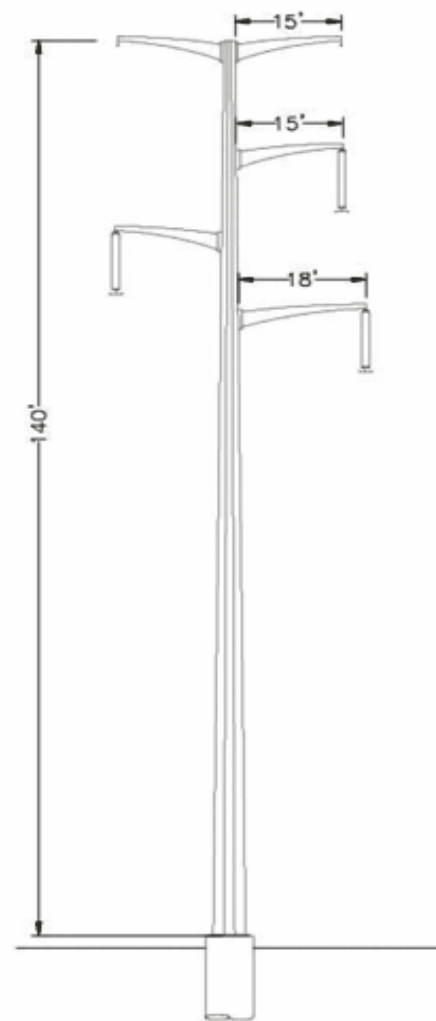
###### **3.1.1.1 Split Rock to Lakefield Junction 345 kV Line**

Xcel Energy is proposing to use single pole, galvanized steel, davit arm structures for the 345 kV transmission line. These structures will be erected on concrete foundations approximately six to eight feet in diameter, and approximately 30 to 40 feet in depth. The structures will have an average height of 120 to 140 feet and an average span of 950 feet. The conductor is proposed to be double bundled (two conductors) 954 kcmil Type 13, Cardinal/ACSS/TW trapezoidal wire for each phase.

Figure 3 depicts the 345 kV single circuit structures that would be used when paralleling I-90. There are some instances along the Interstate Route where existing 115 kV and 345 kV transmission lines are located near the proposed route, such as Segment T1. Xcel Energy will consider double circuiting with existing lines and exercise the option when feasible and prudent. Figure 4 shows a 345 kV/115 kV double circuit line, and Figure 5 shows a 345/345 kV double circuit structure that would be used along Segment I15. Figure 6 depicts the 345/161 kV double circuit structures that will be used for portions of the routes that would be double circuited with existing 161 kV lines.

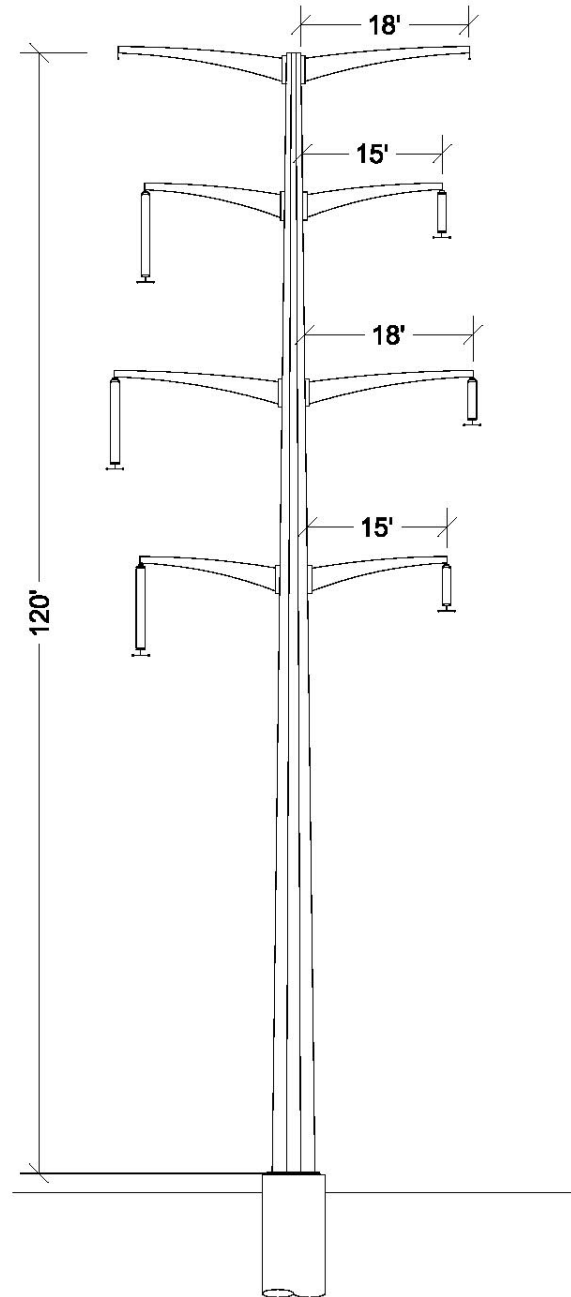
For most of the Alliant Route, 345/161 kV double circuit structures would be used. These structures will replace the existing 161 kV H-frame structures, which will be removed when construction of the new line is complete. The majority of this line is owned by Alliant Energy, but Xcel Energy owns the 11.9 miles of 161 kV line from segments T2 to T4. Alliant Energy owns the remainder of the 161 kV line along the Alliant Route. Where feasible, Alliant Energy has agreed to allow Xcel Energy to double circuit its line on the existing ROW and Xcel Energy believes this can be accommodated for the entire route. There will be single pole, single circuit 345 kV structures in areas where the 161 kV transmission line is not present, as shown in Figure 3. Special structures may be utilized in areas where long spans, corner structures, or special issues arise such as wetland or avian issues. For instance, in areas where long spans are required to cross wetlands or to address avian issues, wood or steel H-frame structures may be used. Figure 7 depicts a typical 345 kV H-frame structure.

**FIGURE 3**  
**SINGLE CIRCUIT 345KV**



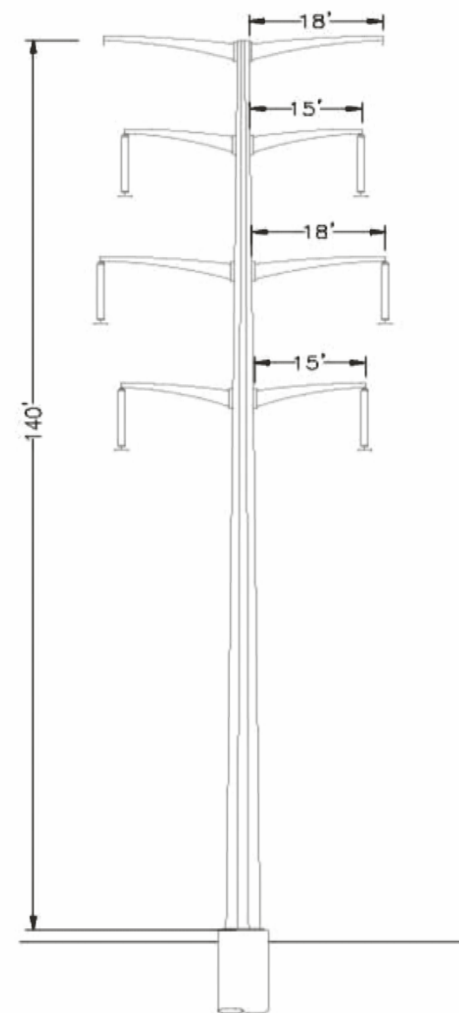
**Single Circuit 345kV**

**FIGURE 4**  
**DOUBLE CIRCUIT 345/115KV**



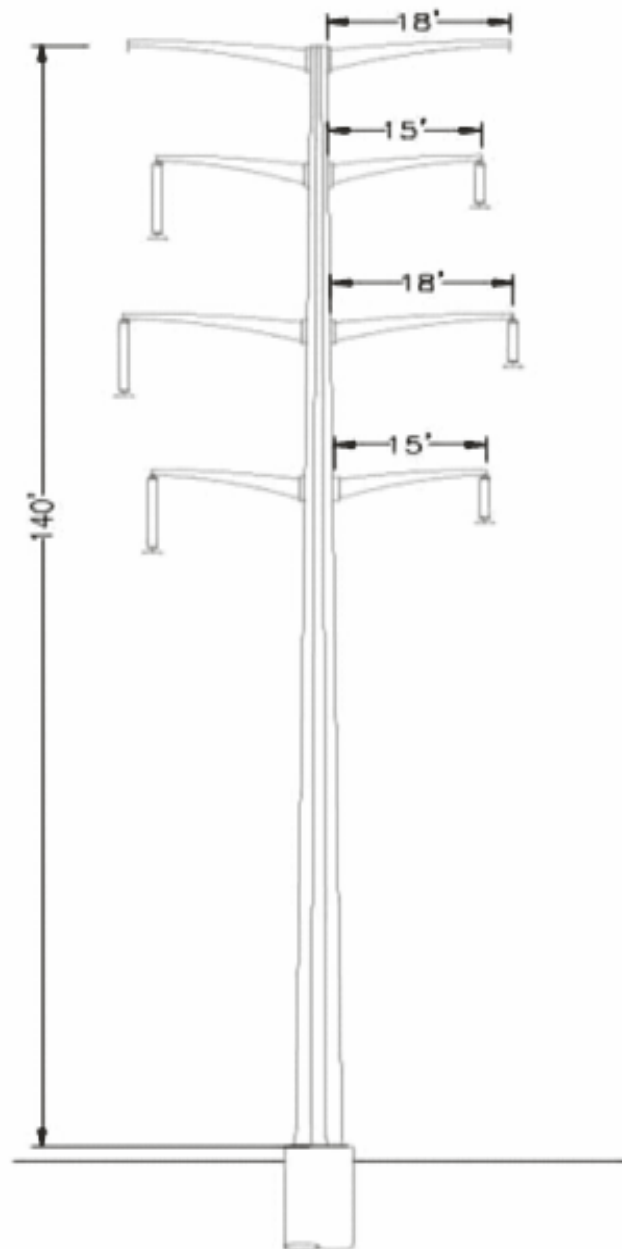
**Double Circuit 345kV/115kV**

**FIGURE 5**  
**DOUBLE CIRCUIT 345/345KV**



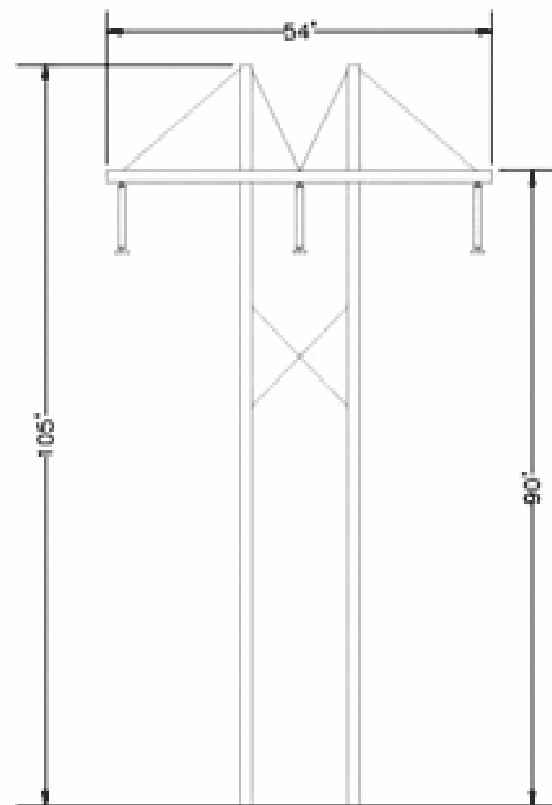
**Double Circuit 345kV/345kV**

**FIGURE 6**  
**DOUBLE CIRCUIT 345/161KV**



**Double Circuit 345kV/161kV**

**FIGURE 7**  
**345 KV H-FRAME**



**Single Circuit 345kV**

### 3.1.1.2 Nobles to Chanarambie 115 kV Line

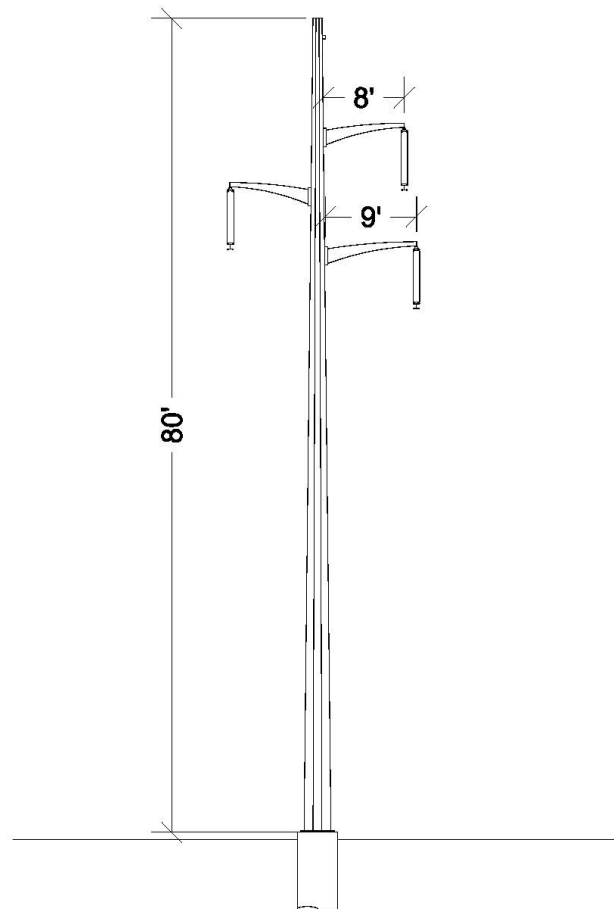
For the 115 kV transmission line routes, Xcel Energy is proposing to use single pole, galvanized steel, davit arm structures. The tangent structures are proposed to be direct embedded in the soil, while the angle and dead end structures will be erected on concrete foundations approximately five to seven feet in diameter. The structures will have an average height of 70 to 80 feet and an average span of 400 feet. The conductor is proposed to be double bundled (two conductors) 795 kcmil 26/7 (Drake) ACSS for each phase.

The Company notes that in the CON process, Xcel Energy sought approval to build the 115 kV line using single conductors. The Company will be informing the Commission of this proposed change in accordance with Minn. Rule 7849.0400, Subd. 2(H).

Figure 8 depicts the 115 kV single circuit structures that would be used when following the East or West routes. The West Route also parallels a 69 kV transmission line for sections of the route and, where feasible and prudent, Xcel Energy would use 115/69 kV double circuit structures similar to those depicted in Figure 9. As with the 345 kV transmission line, special structures may be utilized in areas where long spans, corner structures or special issues arise.

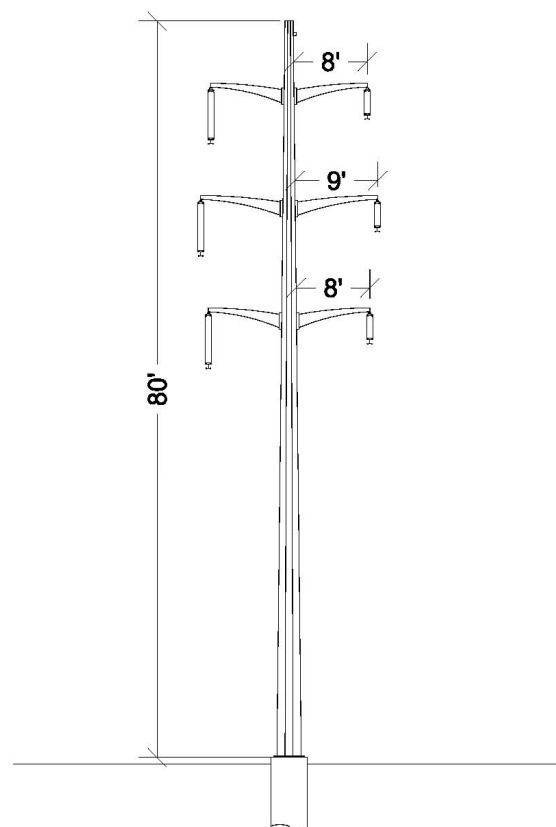
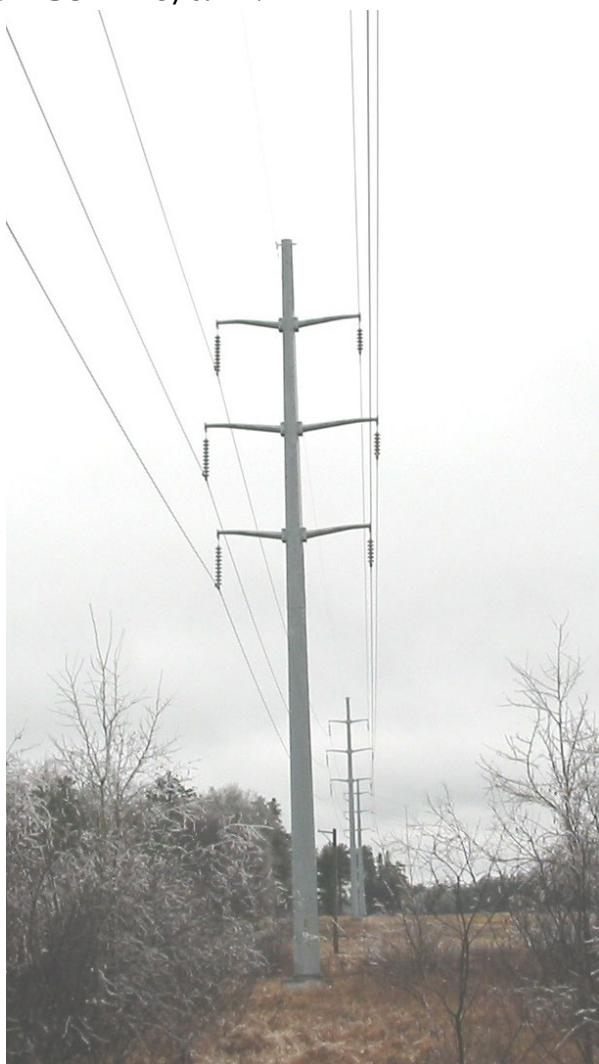
Xcel Energy will also design some sections of the final 115 kV route to accommodate a 34.5 kV underbuild (Figures 10 and 11). This will primarily be in areas near Xcel Energy's Chanarambie, Nobles County and Fenton substations where there will be numerous lines entering and exiting the substations. Xcel Energy will determine those areas at the time the transmission line is designed.

**FIGURE 8**  
**115 KV SINGLE CIRCUIT**



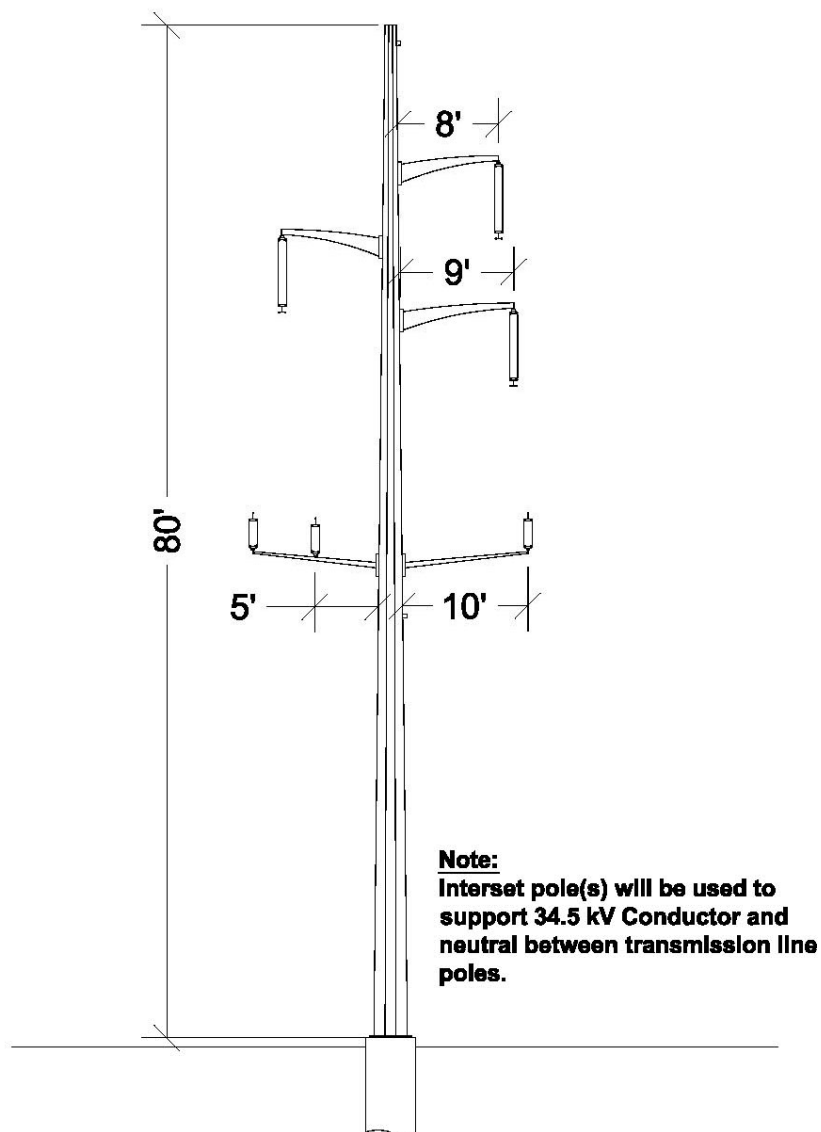
**Single Circuit 115kV**

**FIGURE 9**  
**DOUBLE CIRCUIT 115/69 KV**



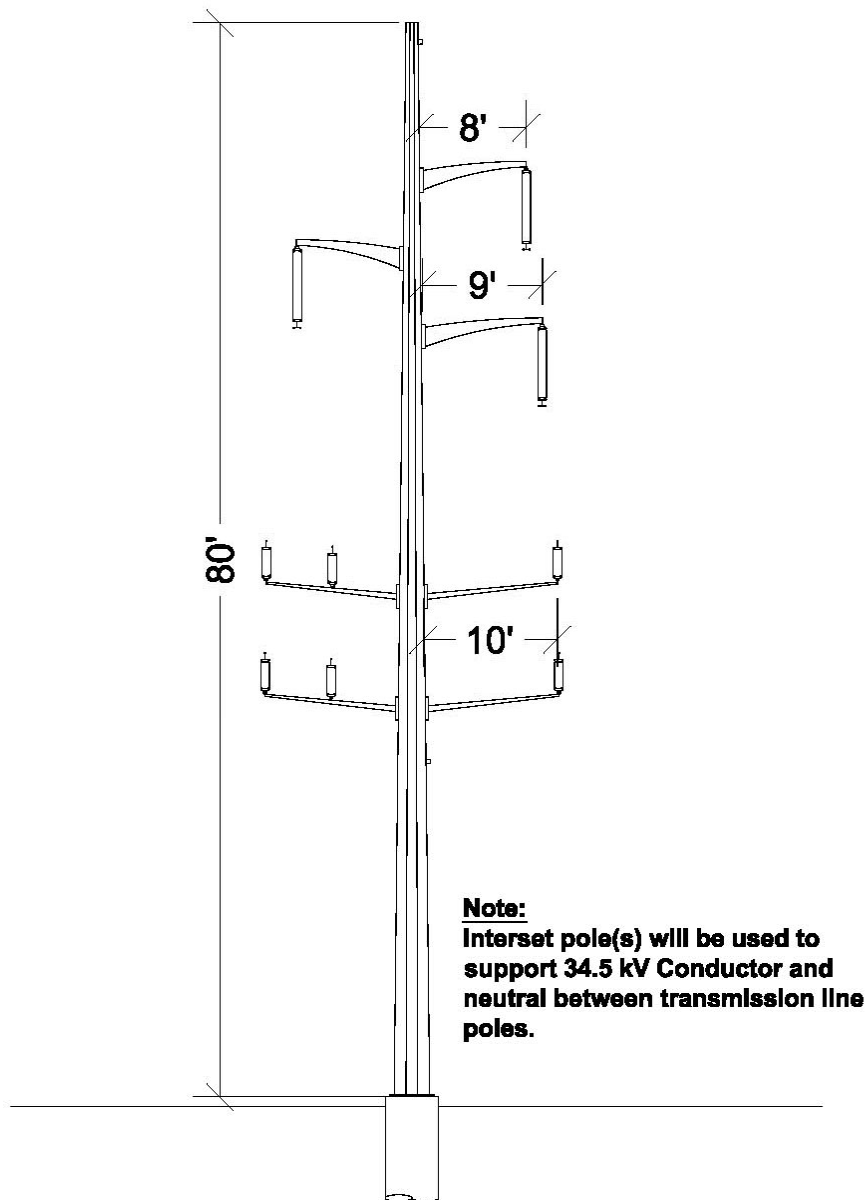
**Double Circuit 115kV/69kV**

**FIGURE 10**  
**SINGLE CIRCUIT 115 KV WITH SINGLE CIRCUIT 34.5 KV**  
**UNDERBUILD PROVISION**



## **Single Circuit 115kV with 34.5kV Underbuild Provision**

**FIGURE 11**  
**SINGLE CIRCUIT 115 KV WITH DOUBLE CIRCUIT 34.5 KV**  
**UNDERBUILD PROVISION**



**Single Circuit 115kV with  
Double Circuit 34.5kV  
Underbuild Provision**

### 3.1.2 DESIGN OPTIONS TO ACCOMMODATE FUTURE EXPANSION

#### 3.1.2.1 Transmission Lines

Xcel Energy reviewed the possibility of proposing the 345 kV structures to be designed to carry another 345 kV circuit for the Interstate Route. At this time the Company sees no need to propose that option. In addition, the portion of the route around Worthington is proposed to be double circuited with the existing Alliant Line, which again would utilize any expansion possibilities.

Xcel Energy is proposing to build the 115 kV Nobles to Chanarambie transmission line with bundled 795 ACSS conductors to accommodate future wind development on Buffalo Ridge. Initially Xcel Energy proposed installation of single 795 ACSS conductors for each phase, which results in a 310 MVA rating. After additional study, the Company has concluded that utilizing bundled 795 ACSS conductors for each phase, which results in a 600 MVA rating for the line, is the better electrical solution for these two lines. The “bundled” conductor configuration consists of two conductors spaced approximately 18 inches apart at the end of each insulator string.

This change is due to the dramatic growth in wind generation and requests for interconnection service, specifically in the vicinity of these two lines. With larger and larger machines becoming the norm, the total megawatts to be interconnected along these lines is increasing even though the number of machines or density of machines anticipated remains about the same. At typical Buffalo Ridge turbine densities, it is likely that more megawatts of production capacity than can be accommodated with a 310 MVA line will develop along the Nobles to Chanarambie 115 kV line. By utilizing bundled conductors, rather than a single conductor, more wind generators are able to interconnect along the 115 kV line. This is not speculative, but reflective of existing signed contracts Xcel Energy has with wind developers and other projects in the queue for interconnection studies.

Therefore, we believe it is prudent both financially and from a land use perspective to double the capacity of the proposed line by installing two-795 ACSS conductors per phase. Adding a second conductor per phase adds \$50,000 per mile to the cost of the proposed line, while a completely new line on new right-of-way would cost approximately \$360,000 per mile. If bundled conductors are not installed, Xcel Energy would need to build a second 115 kV line roughly paralleling the proposed line and separated by just a few miles.

Xcel Energy plans to file a request to the PUC regarding the proposed changes to the two transmission lines certified in the Buffalo Ridge Transmission Line Docket (Docket No: E-002/CN-01-1958) as required in Minn. Rule 7849.0400, Subd.2(H) concurrently with this application.

#### **3.1.2.2 Substations**

Due to the significant amount of development planned in the region, the Nobles County Substation will be designed to accommodate future expansion and upgrades of the substation. This will include connecting other transmission lines and additional 34.5 kV lines to the substation to accommodate additional wind development. Xcel Energy will acquire adequate property for the future expansions and to maintain a buffer around the substation site. The initial and ultimate design for the Nobles County substation is included as Appendix C.11-C.12. The Nobles County substation will accommodate the additional wind energy planned in the region.

### **3.2 IDENTIFICATION OF EXISTING UTILITY AND PUBLIC RIGHTS-OF-WAY**

#### **3.2.1 SPLIT ROCK TO LAKEFIELD JUNCTION 345 kV LINE**

As part of the route selection process discussed in more detail in Section 4.1, the use of existing utility and public rights-of-way is considered to help decrease impacts of the new line. This gives the utility the ability to reduce the width of new ROW required by using a part of the existing corridor or sharing all of it.

Depending on which substation site is chosen, the Interstate Route will utilize existing utility and public ROW for approximately 88 to 91 percent of the entire length. The majority of the ROW that is shared is along I-90. In addition to I-90, a portion of this route also shares ROW with a 161 kV transmission line, a 345 kV transmission line, or a county/township road. There is approximately three miles of ROW that does not parallel existing facilities along the Interstate Route. Figure 12 identifies the ROW requirements for the 345 kV line when it parallels road ROW, and Figure 13 represents the 345 kV line when it is routed cross-country.

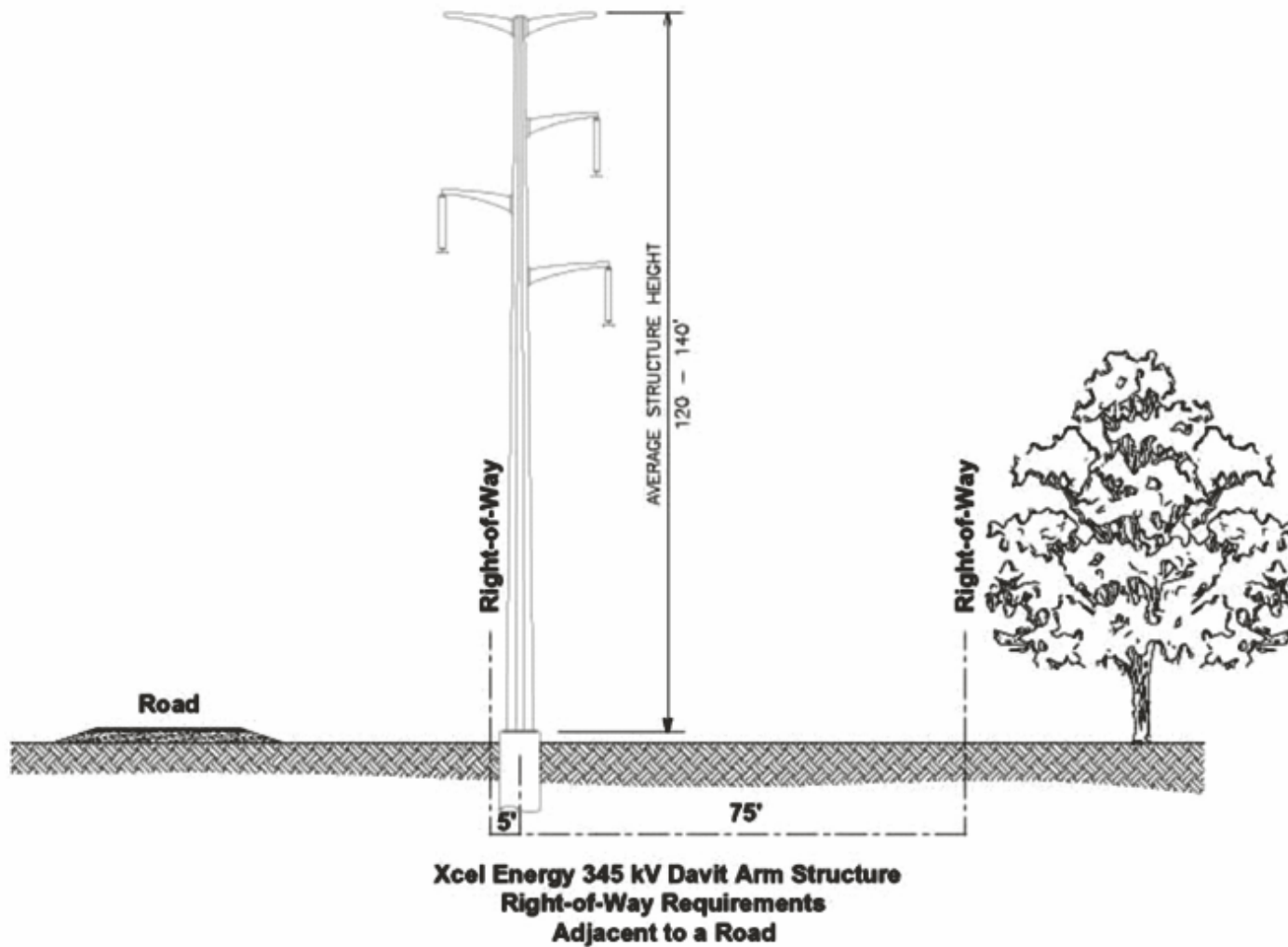
The Alliant Route shares existing utility and public rights-of-way for 71 percent of the entire 86-mile length. The majority of the proposed shared ROW for this project is with the existing 161 kV Alliant Line. This route will also share ROW with a 345 kV transmission line, a 115 kV transmission line, and county/township roads. Approximately 11.5 miles of new ROW that does not parallel existing facilities will be needed for the Alliant Route.

Table 4 summarizes the corridor sharing along the Interstate and Alliant Routes.

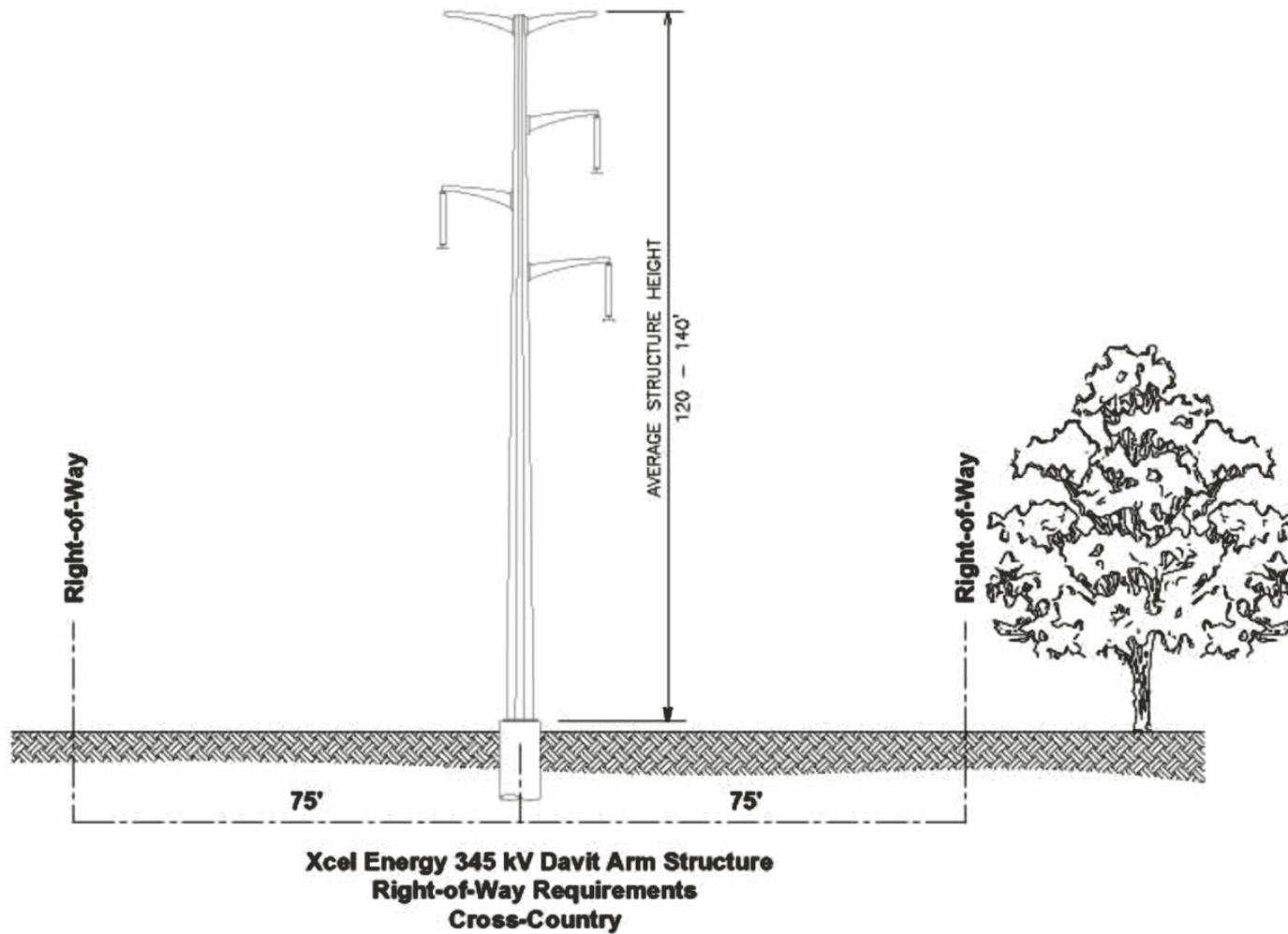
**TABLE 4**  
**SUMMARY OF UTILITY AND PUBLIC ROW CORRIDOR SHARING**  
**FOR THE 345 KV TRANSMISSION LINE**

Route	Description	Length (miles)	Existing Transmission ROW (miles)	Highway ROW (miles)	County/Township Road ROW (miles)	No Corridor Sharing (miles)
Interstate	Substations A and B	88.01	19.46	60.58	4.75	3.22
	Substation C	87.85	23.54	56.58	4.75	2.98
Alliant	All Substations	85.71	67.63	0	6.65	11.43

**FIGURE 12**  
**345 KV ROW WHEN PARALLELING ROAD**



**FIGURE 13**  
**345 KV ROW CROSS-COUNTRY**



### 3.2.2 NOBLES TO CHANARAMBIE 115 kV LINE

The East Route of the 115 kV transmission line utilizes existing utility and public ROW for approximately 98 percent of the entire 37 mile length. The majority of the ROW that is shared is township roads, with a portion of the line sharing highway corridor. Approximately one mile of the route will not have any corridor sharing.

The West Route parallels existing ROW corridors for 70 to 72 percent of the entire 35.64 to 36.17 mile length. The majority of the ROW that is shared is township roads, but it also parallels the highway, and a 69 kV transmission line. Between 7 and 13.5 miles of the route will not have any corridor sharing.

Figure 14 represents the ROW requirements for the 115 kV transmission line paralleling roadway ROW. The ROW requirements for the 115 kV transmission line going cross country is represented in Figure 15.

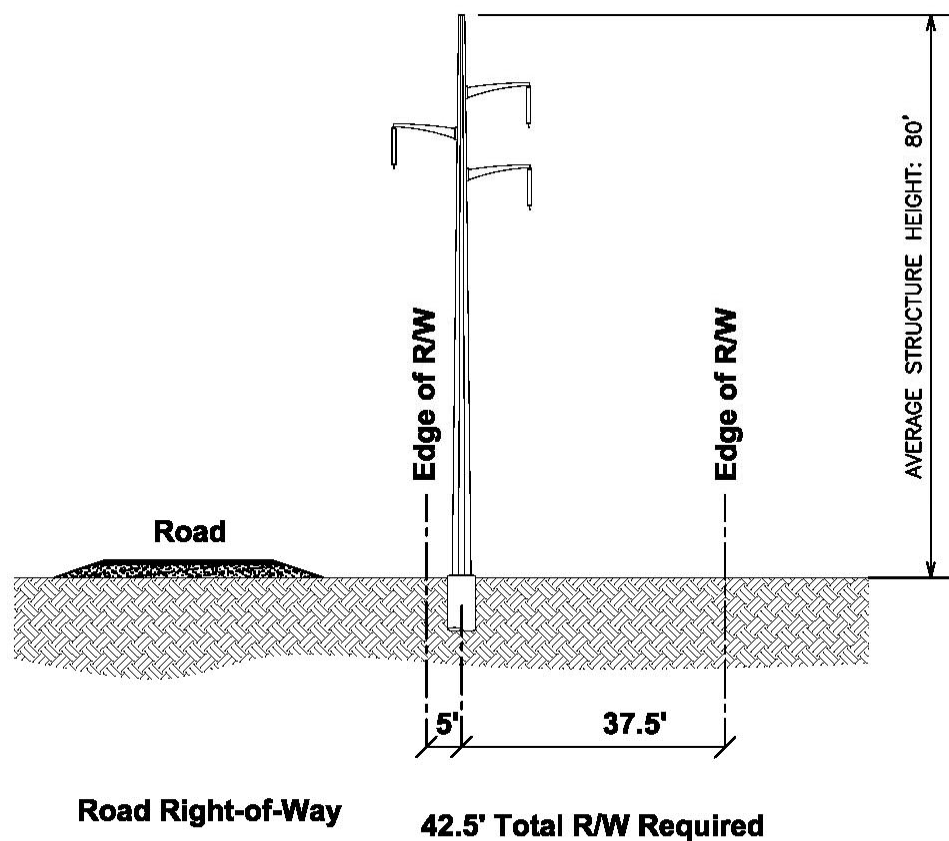
Table 5 summarizes the corridor sharing along the East and West routes.

**TABLE 5**  
**SUMMARY OF UTILITY AND PUBLIC ROW CORRIDOR SHARING**  
**FOR THE 115 KV TRANSMISSION LINE**

Route	Description	Length (miles)	Existing Transmission ROW (miles) <sup>1</sup>	Highway ROW (miles)	County/Township Road ROW (Miles) <sup>1</sup>	No Corridor Sharing (Miles)
West	Substations A and B	36.17	0	3.59	25.14	7.44
	Substation C	35.64	0.50	0	21.60	13.54
East	All Substations	36.66	0	3.59	32.07	1.00

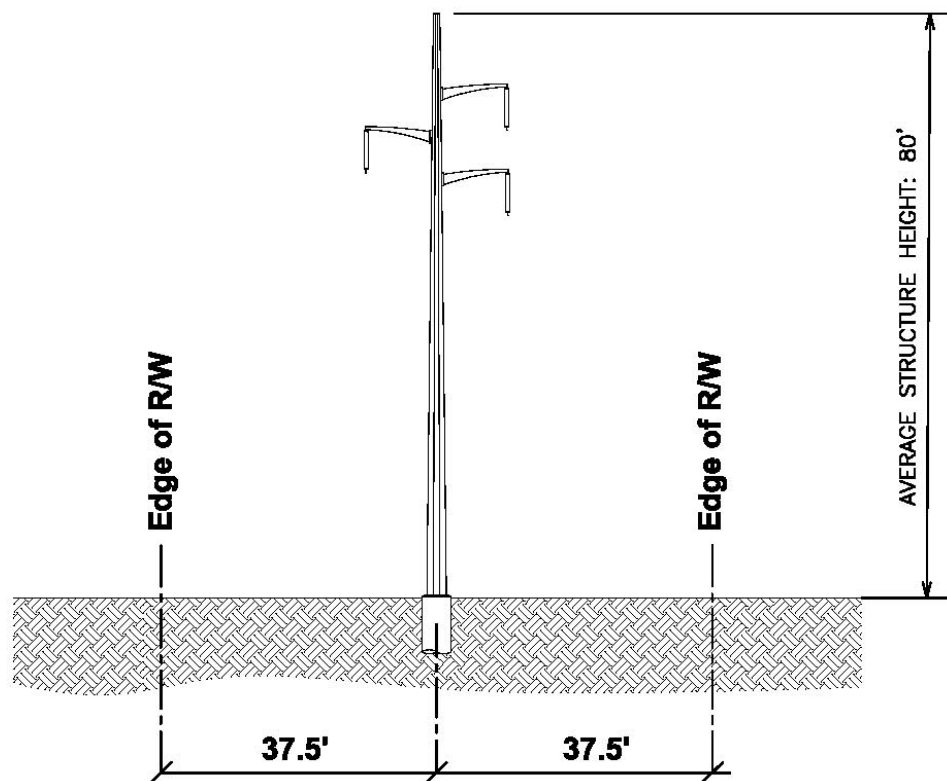
<sup>1</sup> There are instances where transmission and county/township ROW coincide, and account for the discrepancy between total route length and total length of ROW shared.

**FIGURE 14**  
**115 KV ROW WHEN PARALLELING ROAD**



**Xcel Energy 115 kV Davit Arm Structure  
Right-of-Way Requirements  
Adjacent to a Road**

**FIGURE 15**  
**115 KV ROW CROSS-COUNTRY**



**75' Total Right-of-Way**

**Xcel Energy 115 kV Davit Arm Structure  
Right-Of-Way Requirements**

### **3.3 ROW ACQUISITION, CONSTRUCTION, RESTORATION, AND MAINTENANCE PROCEDURES**

#### **3.3.1 RIGHT-OF-WAY ACQUISITION**

After approvals to construct the Project are secured, Xcel Energy will initiate contact with landowners to start the survey for the new line. The majority of the landowners are expected to be aware of the project since Xcel Energy has already held public meetings within the project area to describe the proposed facilities and permitting process. They will also be provided information on the project as it proceeds through the EQB permitting process. Xcel Energy's Land Rights Agents will work with the landowners at an early stage to answer questions about the project and to obtain permission for route surveys and soil investigations prior to construction. As the design of the line is further developed, contacts with the owners of affected properties will continue and the negotiation and acquisition phase will begin for Xcel Energy to obtain the necessary land or easement rights for the facilities.

During the acquisition phase, individual property owners will be advised as to the construction schedules, needed access to the site and any vegetation clearing required for the Project. The ROW will be cleared of the amount of vegetation necessary to construct, operate and maintain the proposed transmission line. It is standard practice to remove any vegetation that would be a danger to the line at a mature height. Also, any vegetation that is in the way of construction equipment may have to be removed. Wood from the clearing operation will be offered to the landowner or removed from the site. Brush will be chipped and disposed of on the ROW.

Many structure locations will require soil investigation to assist with the design of the foundations. Xcel Energy will inform the landowners at the initial survey consultation that soil borings may occur. An independent geotechnical testing company will take and analyze these borings. Survey crews also work with local utilities to identify underground utilities along the route. This minimizes conflicts or impacts to existing utilities along the route.

Where possible, staging and lay down areas will be located within the ROW and limited to previously disturbed or developed areas. When additional property is temporarily required for construction, temporary limited easements (TLE) may be obtained from landowners for the duration of construction. TLEs will be limited to special construction access needs or additional staging or lay down areas required outside of the proposed transmission line ROW.

### 3.3.2 TRANSMISSION CONSTRUCTION PROCEDURES

Construction is planned to begin once required approvals are obtained and easement acquisition is completed. A detailed construction schedule will be developed based upon availability of crews, outage restrictions for lines that may be affected, weather conditions, spring load restrictions on roads, and any restrictions placed on certain areas for minimizing permanent impacts from construction.

The proposed 115 kV and 345 kV transmission lines will be constructed from existing grade for the majority of the ROW. Generally, moderately sloping terrain conditions have minimal impact on site access by most construction equipment. Flat, level terrain conditions are preferred at, and immediately around, the structure foundation location. Grading is anticipated where it may be necessary to create a level area for foundation construction, construction access and activities at the structure sites. Since the majority of the terrain is flat in this project area, Xcel Energy does not expect to conduct much grading. If a contiguous area of more than one acre is graded, Xcel Energy will acquire the appropriate permits.

The steel poles are approximately three feet to four feet in diameter for the 115 kV line and four to six feet in diameter for the 345 kV line, and will require a hole drilled approximately 15 to 20 feet deep for the 115 kV line and approximately 30 to 40 feet deep for the 345 kV line. Any excess soil will be removed from the site unless otherwise requested by the landowner. The 345 kV steel structures are proposed to be supported by a drilled concrete pier foundation. The 115 kV steel structures are proposed to be supported by embedment into rock-filled steel culverts placed vertically in a drilled hole or on drilled concrete pier foundations approximately five to seven feet in diameter. Structures located in poor or wet soil conditions may require a specially engineered foundation such as a steel caisson that would be vibrated into the ground.

Erosion control methods will be implemented to minimize runoff during construction. Xcel Energy construction crews or an Xcel Energy contractor will comply with local, state, NESC, and Xcel Energy standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, ROW widths, erection of power poles, and stringing of transmission line conductors.

Poles will be delivered to either the staked location or a temporary storage yard leased from a local landowner. If the poles are delivered to the location where they will be installed, they will be placed on the ROW out of the clear zone of any adjacent roadways or designated pathways. Insulators and other hardware will be attached while the pole is on the ground. The pole will then be lifted, placed and secured on the foundation by a crane.

Once the structures have been erected, conductors will be installed by establishing stringing setup areas within the ROW. The stringing setup areas will usually be established every two miles along the Project route. Conductor stringing operations will also require brief access to each structure to secure the conductor wire to the insulators and to install shield wire clamps once final sag is established. Temporary guard or clearance poles will be installed as needed over existing distribution lines, communication lines, streets, roads, highways, railways or other obstructions after any necessary notifications are made and permits obtained. This ensures that conductors will not obstruct traffic or contact existing energized conductors or other cables.

### **3.3.3 RESTORATION PROCEDURES**

During construction, crews will attempt to limit ground disturbance wherever possible. Upon completion of construction activities, landowners will be contacted to determine if any additional restoration due to construction damage is necessary. Disturbed areas will be restored to their original condition to the maximum extent practicable and as negotiated with the landowner. Post-construction reclamation activities include the removing and disposing of debris, dismantling all temporary facilities (including staging and lay down areas), employing appropriate erosion control measures and reseeding areas disturbed by construction activities with vegetation similar to that which was removed.

### **3.3.4 MAINTENANCE PROCEDURES**

Xcel Energy will periodically use the ROW to perform inspections, maintain equipment, and make repairs over the life of the line. Xcel Energy will also conduct routine maintenance approximately every five years to remove undesired vegetation that may interfere with the safe and reliable operation of the proposed transmission line.

## **3.4 SUBSTATIONS**

### **3.4.1 SPLIT ROCK SUBSTATION MODIFICATIONS**

The Split Rock Substation is located east of Sioux Falls, South Dakota in the SE ¼ of Section 30, NE ¼ of Section 31, and the NW ¼ of Section 32 in Township 102N, Range 48W. The substation is owned and operated by Xcel Energy. Modifications to the substation will include upgrading the existing 345 kV, 4-position ring-bus configuration into a 5-position ring to provide a line termination for the new 345 kV transmission line, and installing a line-termination dead end, one new breaker, and associated switches and line relaying. The substation expansion will require grading and fencing approximately one acre on the eastern end of the existing substation. The control house will likely be expanded as well. Drawings representing the substation modifications are attached in Appendix C.5 to C.6.

This work will be reviewed as part of the South Dakota Public Utilities Commission route approval process.

### **3.4.2 LAKEFIELD JUNCTION SUBSTATION MODIFICATIONS**

The Lakefield Junction Substation is located east of the city of Lakefield, in Section 3, Township 102N, Range 35W. This substation is owned and operated by Alliant Energy. No expansion of the substation site is required. Modifications to the substation will include the following equipment changes and additions to accommodate the new 345 kV line and the work will be done by Alliant Energy. Three 161 kV circuit breakers will be replaced to accommodate the new 345 kV line. An existing 345 kV line termination may be moved from the southwest terminal to the southeast terminal and will be placed on a new dead end structure. The new 345 kV line will enter the substation from the south and will require a new 345 kV circuit breaker. Preliminary routes for the transmission lines into and out of the substation are included as Appendix C.2 to C.4. Drawings representing the substation modifications are attached in Appendix C.7 to C.8.

### **3.4.3 NEW NOBLES COUNTY SUBSTATION**

There are three possible substation sites. Substation A is located in the NE  $\frac{1}{4}$  of Section 23, Township 103N, Range 41W. Substation B is located in the North  $\frac{1}{2}$  of Section 35, Township 103N, Range 41W. Substation C is located in the East  $\frac{1}{2}$  of Section 31, Township 103N, Range 41W.

The new substation will be constructed next to the new 345 kV line. It will be constructed in Nobles County, and will be the interconnection point for the Chanarambie to Nobles County 115 kV transmission line. The potential sites proposed by Xcel Energy are identified in Appendix C.1. Xcel Energy has identified the three sites in Appendix C.1 as the most favorable locations for the new substation.

Several landowners have expressed an interest in selling property for the substation. Xcel Energy has not entered into negotiations for property at any of the sites for the following reasons:

- 1) Final route selection for the Nobles to Chanarambie 115 kV line will impact the final location of the substation.
- 2) The EQB process may result in other sites to consider for the substation.
- 3) Xcel Energy did not want to enter into options for property at all three sites since the final site may change.

The recommended area to be acquired to accommodate the substation structures, the transmission lines, and any additional lines that will be constructed in the near future is forty acres. Within these forty acres, fifteen acres will ultimately be graded to accommodate the substation and anticipated substation expansions. Initially a 700 ft. x 600 ft. area would be graded for this project. The remaining 25 acres will be designed for future expansion and as a buffer to adjacent properties.

The substation will include a 345 kV ring-bus configuration with line terminations for the Split Rock and Lakefield Junction lines, and a 345 kV-115 kV transformer. There will also be a 115 kV breaker and a half bus configuration with a line termination for the Chanarambie line. The substation will also include one or more 115 kV-345 kV transformers and a 34.5 kV yard to accommodate interconnection of wind generation.

New concrete foundation will be installed to support the control house and electrical equipment such as transmission line structures and dead ends, transformers, breakers, and switches. The control house will contain the protective relay, control, and communications equipment. Potential plans for the initial and ultimate substation layout are attached as Appendix C.11 to C.12.

#### **3.4.4 CHANARAMBIE SUBSTATION**

The Chanarambie Substation is located in Section 31, Township 106N, Range 43W. The substation is owned and operated by Xcel Energy. Modifications to the substation will include adding the 115 kV line connection and a new breaker. No expansion of the substation site is necessary. Drawings representing the substation modifications are attached in Appendix C.9 to C.10.

#### **3.4.5 FENTON SUBSTATION**

At this time, Xcel Energy is not applying for a permit for the Fenton Substation planned to be located near Chandler. Several factors will impact the final selection of the site, including the locations of additional wind generation in that area. Xcel Energy does not have signed contracts with the developers in this area at this time, so final site selection has not been made. Once Xcel Energy has signed agreements with developers, the company will work with them on site selection. Once the site is determined, Xcel Energy will apply for permits from the appropriate agencies. The Fenton substation is expected to be built and completed around the time this project is completed. The primary purpose of the Fenton Substation will be to accommodate interconnection of wind generation. Once contracts with wind developers are finalized, Xcel Energy will move forward in siting the Fenton Substation.

### **3.4.6 SUBSTATION PROPERTY ACQUISITION, CONSTRUCTION, RESTORATION AND MAINTENANCE PROCEDURES**

#### **3.4.6.1 Property Acquisition – Nobles County Substation**

Some landowners have contacted Xcel Energy to express interest in selling their property to Xcel Energy for the new substation. Xcel Energy has not entered into negotiations on any parcels as explained in Section 3.4.3. Once the EQB issues a permit, Xcel Energy will contact the owner(s) of the site to discuss the Project in detail. Xcel Energy will request the necessary surveys and soil investigations to determine whether the site is acceptable for a substation. Xcel Energy will then develop a more site-specific design. Xcel Energy will obtain the necessary land rights for the facility and will seek to obtain the property through voluntary purchase.

During the substation construction phase, any affected property owners will be advised as to the construction schedules or needed access to the site. To construct, operate and maintain the proposed substation, all vegetation will be cleared from the substation footprint area, from the substation driveway area, and from a buffer area of 15 feet outside the substation fence. Vegetation on the property outside of the substation footprint, driveway, and buffer will be left undisturbed, except where it must be impacted to allow for transmission line access to the substation.

#### **3.4.6.2 Substation Construction Procedures**

Construction will begin once the final design is complete and any necessary property is acquired. A detailed construction schedule will be developed based upon availability of crews, outage restrictions for any transmission lines that may be affected, weather conditions, spring load restrictions on roads, and any restrictions placed on certain areas for minimizing permanent impacts from construction.

Approximately 15 acres of land will be graded to construct the Nobles County substation. Once the site is graded, a perimeter fence will be installed to secure the site and concrete foundations will be poured to support the substation equipment and control house. At that point, erection of the control house and substation equipment would commence.

Xcel Energy provides erosion control methods to be implemented to minimize runoff during substation construction and since the project will impact less than one acre, a NPDES permit will be acquired. Xcel Energy construction crews or an Xcel Energy contractor will comply with local, state, NESC and Xcel Energy standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, ROW widths, erection of power poles and stringing of transmission line conductors. Additionally, a Stormwater Pollution Prevention Plan (SWPPP)

will be implemented in compliance with the National Pollutant Discharge Elimination System (NPDES).

#### **3.4.6.3 Restoration Procedures**

Upon completion of construction activities, Xcel Energy will restore the remainder of the site. Post-construction reclamation activities include the removing and disposing of debris, dismantling all temporary facilities (including staging areas), employing appropriate erosion control measures and reseeding areas disturbed by construction activities with vegetation similar to that which was removed. Where appropriate, Xcel Energy will incorporate methods to screen the final site.

#### **3.4.6.4 Maintenance Procedures**

Xcel Energy will perform periodic inspections, maintain equipment, and make repairs over the life of the substation. Xcel Energy will also conduct routine maintenance as required to remove undesired vegetation that may interfere with the safe and reliable operation of the substation.

### **3.5 ELECTRIC AND MAGNETIC FIELDS**

#### **3.5.1 ELECTRIC FIELDS**

Voltage on any wire (conductor) produces an electric field in the area surrounding the wire. The electric field associated with a high voltage transmission line extends from the energized conductors to other nearby objects such as the ground, towers, vegetation, buildings and vehicles. The electric field from a power line gets weaker as one moves away from the line. Nearby trees and building material also greatly reduce the strength of power line electric fields.

The intensity of electric fields is associated with the voltage of the line and is measured in kilovolts per meter (kV/M). Power line electric fields near ground are designated by the difference in voltage between two points (usually one meter). Table 6 provides the electric fields at maximum conductor voltage for the proposed 115 kV and 345 kV transmission lines. Maximum conductor voltage is defined as the nominal voltage plus five percent.

The proposed 115 kV transmission line will have a maximum magnitude of electric field density of approximately 1.24 kV per meter underneath the conductors one meter above ground level. The proposed 345 kV transmission line will have a maximum magnitude of electric field density of approximately 4.6 kV per meter underneath the conductors one meter above ground level. This is significantly less than the maximum limit of 8 kV per meter that has been a permit condition imposed by the Minnesota EQB in other HVTL applications. The Minnesota EQB

standard was designed to prevent serious hazard from shocks when touching large objects, such as tractors, parked under extra high voltage transmission lines of 500 kV or greater.

**TABLE 6**  
**CALCULATED ELECTRIC FIELDS (KV/M) FOR PROPOSED**  
**TRANSMISSION LINE DESIGNS (3 FEET ABOVE GROUND)**

Line	Type	Voltage	Distance to Proposed Centerline								
			-300'	-200'	-100'	-50'	0'	50'	100'	200'	300'
Split Rock to Lakefield 345 kV line	Single Circuit H-Frame	362kV	.04	0.1	0.9	2.9	1.5	2.9	0.9	0.1	0.04
	Single Circuit Single Pole Davit Arm	362kV	.04	0.1	0.5	2.1	2.6	2.1	0.7	0.1	0.05
	345/69 kV Single Pole Davit Arm	362kV/72kV	.04	0.1	0.5	2.4	2.4	1.2	0.5	0.1	0.05
	345/161 kV Single Pole Davit Arm	362/169kV	.05	0.1	0.15	1.6	3.0	0.4	0.1	0.03	0.02
	345/345 kV Single Pole Davit Arm	362/362kV	.02	0.05	0.13	1.5	2.4	1.5	0.13	0.05	0.02
Chanarambie to Nobles County 115 kV line	Single Circuit, Single Pole Davit Arm	120kV	.009	0.02	0.1	0.4	0.8	0.5	0.1	0.03	0.01
	115/69 kV Single Pole Davit Arm	120/72kV	.01	0.02	0.06	0.14	1.24	0.05	0.05	0.02	0.01
	115/34.5 kV single circuit underbuild Single Pole Davit Arm	120/36kV	.01	0.03	0.10	0.31	0.40	0.12	0.12	0.03	0.01
	115/34.5 kV double circuit underbuild Single Pole Davit Arm	120/36/36kV	0.01	0.02	0.11	0.36	0.15	0.39	0.13	0.03	0.01

### 3.5.2 MAGNETIC FIELDS

Current passing through any conductor, including a wire, produces a magnetic field in the area around the wire. The magnetic field associated with a high voltage transmission line surrounds the conductor and decreases rapidly with increasing distance from the conductor. The magnetic field is expressed in units of magnetic flux density, expressed as gauss (G).

The question of whether exposure to power-frequency (60 Hz) magnetic fields can cause biological responses or even health effects has been the subject of considerable research for the past three decades. There is presently no Minnesota statute or rule that pertains to magnetic field exposure. The most recent and exhaustive reviews of the health effects from power-frequency fields conclude that the evidence of health risk is weak. The National Institute of

Environmental Health Sciences (NIEHS) issued its final report, “NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields” on June 15, 1999, following six years of intensive research. NIEHS concluded that there is little scientific evidence correlating extra low frequency EMF exposures with health risk.

The Minnesota State Interagency Working Group on EMF Issues, consisting of members from the Minnesota Department of Health, Department of Commerce, Public Utilities Commission, Pollution Control Agency, and Environmental Quality Board conducted research related to EMF, which resulted in similar findings to the NIEHS report. The group issued “A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options” in September of 2002 wherein it concluded:

Research on the health effects of EMF has been carried out since the 1970s. Epidemiological studies have mixed results – some have shown no statistically significant association between exposure to EMF and health effects, and some have shown a weak association. More recently laboratory studies have failed to show such an association, or to establish a biological mechanism for how magnetic fields may cause cancer.

\* \* \*

*The Minnesota Department of Health (MDH) concludes that the current body of evidence is insufficient to establish a cause and effect relationship between EMF and adverse health effects. However, as with many other environmental health issues, the possibility of health risk from EMF cannot be dismissed.*

The conclusions of the Minnesota State Interagency Working Group are also consistent with those reached by the Minnesota Department of Health in 2000 and the 1999 Final Report by the NIEHS. Table 7 provides the existing and estimated magnetic fields based on the proposed line and structure design. The expected magnetic field for the proposed structure type and voltage has been calculated and has been calculated at various distances from the center of the pole in milligauss.

While the general consensus is that electric fields pose no risk to humans, the question of whether exposure to magnetic fields potentially can cause biological responses or even health effects continues to be the subject of research and debate. In addressing this issue, Xcel Energy provides information on EMF to the public, interested customers, and employees to assist them in making an informed decision about EMF. Xcel Energy will provide measurements for landowners, customers and employees who request them. In addition, Xcel Energy has followed the “prudent avoidance” guidance suggested by most public agencies. This includes

using structure designs that minimize magnetic field levels and attempting to site facilities in locations with lower residential densities.

### **3.5.3 STRAY VOLTAGE**

Stray voltage is defined as a natural phenomenon that can be found at low levels between two contact points in any animal confinement area where electricity is grounded. By code, electrical systems, including farm systems and utility distribution systems, must be grounded to the earth to ensure continuous safety and reliability. Inevitably, some current flows through the earth at each point where the electrical system is grounded and a small voltage develops. This voltage is called neutral-to-earth voltage (NEV). When a portion of this NEV is measured between two objects that may be simultaneously contacted by an animal, it is frequently called stray voltage. Stray voltage is not electrocution, ground currents, EMFs or earth currents. It only affects farm animals that are confined in areas of electrical use. It does not affect humans.

Stray voltage has been raised as a concern on some dairy farms because it can impact operations and milk production. Problems are usually related to the distribution and service lines directly serving the farm or the wiring on a farm. In those instances when transmission lines have been shown to contribute to stray voltage, the electric distribution system directly serving the farm or the wiring on a farm was directly under and parallel to the transmission line. These circumstances are considered in installing transmission lines and can be readily mitigated. The proposed 115 kV and 345 kV transmission lines are not proposed to run parallel to any existing distribution line for long distances. Therefore, no stray voltage issues are anticipated with this Project.

**TABLE 7**  
**CALCULATED MAGNETIC FLUX DENSITY (MILLIGAUSS FOR PROPOSED**  
**TRANSMISSION LINE DESIGNS (3 FEET ABOVE GROUND))**

Line	Type	Condition	Amps	Distance to Proposed Centerline								
				-300'	-200'	-100'	-50'	0'	50'	100'	200'	300'
Split Rock to Lakefield 345 kV	Single Circuit H-Frame	Average	540	2.0	4.3	16	42	68	42	16	4.3	2.0
		Peak	900	3.3	7.2	26	70	113	70	26	7.2	3.3
	Single Circuit Single Steel Pole Davit Arm	Average	540	1.1	2.6	9.9	31	65	28	11	3.1	1.4
		Peak	900	1.9	4.3	16	51	108	47	18	5.1	2.4
	345/69 kV Single Steel Pole Davit Arm	Average	540/ 120	1.3	3.0	11	34	61	23	9.7	3	1.4
		Peak	900/ 200	2.2	5.0	19	56	102	38	16	5	2.4
	345/161 kV Single Steel Pole Davit Arm	Average	540/ 400	0.7	1.9	8.5	27	53	15	3.6	0.5	0.1
		Peak	900/ 660	1.2	3.1	5.9	45	88	25	5.9	0.8	0.2
	345/345 kV Single Steel Pole Davit Arm	Average	540/ 540	0.4	1.1	6.4	24	64	24	6.2	1.1	0.4
		Peak	900/ 900	0.6	1.8	11	40	106	39	10	1.8	0.6
Chanarambie To Nobles County 115 kV	Single Circuit, Single Steel Pole Davit Arm	Average	1080	1.1	2.6	10	30	87	32	11	3.1	1.4
		Peak	1800	1.9	4.3	16	50	146	53	18	5.2	2.4
	115/69 kV Single Steel Pole Davit Arm	Average	1080/ 120	1.6	3.6	14	44	102	28	10	3.1	1.4
		Peak	1800/ 200	2.6	6.1	23	73	169	47	17	5.1	2.3
	115/34.5 kV Single Circuit Underbuild Single Steel Pole Davit Arm	Average	1080/ 350	1.4	3.0	11	35	115	34	11	3.1	1.4
		Peak	1800/ 700	2.3	5.2	19	61	202	57	19	5.2	2.3
	115/34.5 kV Double Circuit Underbuild Single Steel Pole Davit Arm	Average	1080/ 350/ 350	1.4	3.0	11	30	77	30	11	3.1	1.4
		Peak	1800/ 700/ 700	2.4	5.2	18	51	136	50	19	5.2	2.4

### **3.6 TRANSMISSION LINE RELIABILITY**

The PUC has issued CONs for a system of four new HVTLs, including the two HVTLs for which a routing permit is sought in this Application. In granting its approval, the PUC determined the system of lines was the most reasonable and prudent option to reliably increase outlet capacity from the Buffalo Ridge area. The routes proposed in the Application for the new 345 kV line and the new 115 kV line are designed to support electric system reliability.

Several of the route segments include double circuiting with existing transmission lines. Xcel Energy discussed the proposals with its system operations and planning groups, as well as Alliant Energy, the utilities that own some of the lines that would be double circuited, and no major concerns regarding impacts to reliability during construction or operation were raised. If route segments are selected that require outages of existing lines, construction will be scheduled and coordinated to minimize any potential impacts to the reliability of the area.

## **4.0 ENVIRONMENTAL INFORMATION: SPLIT ROCK SUBSTATION TO LAKEFIELD JUNCTION SUBSTATION 345 KV LINE**

### **4.1 ROUTE SELECTION PROCESS**

Routes for the 345 kV transmission line were selected after careful consideration by several planning entities within Xcel Energy. The project was originally identified during the planning process by a team of siting, right-of-way, and engineering personnel. The team reviewed the general area identified for significant routing issues that may arise. This information was included in the CON application.

Together, the team developed a project corridor for the route using digital data such as aerials and topographic maps. The siting group analyzed the corridor details and identified preliminary route options based on opportunities to:

- ◆ Share ROW with existing transmission lines by double circuiting or paralleling an existing line;
- ◆ Avoid any impacts to reliability (i.e. consider if existing lines can be taken out of service for construction).
- ◆ Parallel roads, decreasing the amount of ROW required (the road that requires the least amount of clearing is normally chosen);
- ◆ Parallel field lines, property lines, or railroad ROW, where access is adequate and the transmission line will cause minimal conflicts; and
- ◆ Minimize length of the transmission line to minimize impact area and costs for the project.

Routes are further narrowed using large scale data by considering those routes that minimize impacts to:

- ◆ High density residential areas;
- ◆ Areas where clearances are limited; and
- ◆ Environmentally sensitive sites such as: wetlands; archaeologically significant sites; areas with threatened, endangered, and species of special concern; areas of significant biological or cultural significance; and state and federal lands.

Once the routes were placed and fine-tuned on the maps, the entire team reviewed the routes in the field. All the issues identified during the initial route and route segment development were addressed while in the field. Routes and route segments were added and/or removed based on the information gathered.

These proposed routes and route segments were then provided to several agencies (DNR, SHPO, USFWS, and, if applicable, local governments), the public and other utilities for review. The routes were reviewed by these groups through two primary means: letters written with a general description of the proposal and maps of the proposed route, and public meetings held in the area of the proposal.

Following input received through public and agency involvement, the routes and route segments were refined. The routes in this Application are the result of that work.

For the 345 kV project, the specific primary routing considerations were:

- 1) Use of existing transmission line ROW: The existing lines along the general route are primarily owned by Xcel Energy and Alliant Energy. Initially the Company considered paralleling the existing lines. After holding public meetings, receiving public input and reviewing the overall impacts, the Company decided to propose the 345 kV line along this route as a double circuit transmission line with the Alliant Energy 161 kV transmission line. Discussion with Alliant Energy and Xcel Energy System Operations determined that sections of the lines could be taken out of service without a significant impact to reliability. A detailed construction outage plan will be developed to ensure this is the case. Additionally, access to the existing transmission lines was favorable.
- 2) Use of the existing I-90 corridor: This corridor has good access and is well-established as a transportation corridor. By placing the 345 kV line near the Interstate and adjacent to the ROW fence, ROW requirements, agricultural impacts, and the number of homes that would be impacted by the proposed route would be decreased. Xcel Energy discussed this potential with MN/DOT and found them in agreement as long as the poles were placed on private property.
- 3) Airport Issues: The routes were chosen to avoid airport issues. Segment I7 was not selected because it could impact the safety zoning for the Worthington Municipal Airport. Likewise, Route Segment I10 was not selected because it has the potential to impact a small airstrip. These two segments are not included in the final routes

chosen, but are a part of the filing. The Luverne airport was also considered, but no impacts were identified based on the locations of proposed routes.

- 4) Minimizing Agricultural Impacts: The final route will either parallel the I-90 ROW five feet from the MN/DOT ROW or double circuit the existing Xcel Energy and Alliant Energy 161 kV transmission lines. Both options will minimize the area lost to farmers as a result of pole placement. As noted above, the choice of single, steel poles minimizes impacts by decreasing the footprint from H-frame to a single pole along the Alliant Route. Additionally not choosing a different type of structure minimizes impacts along I-90.
- 5) Siting of the Nobles County Substation: The new substation needs to be located near both the 345 kV and 115 kV transmission lines. A description of which substation site was chosen is included in Section 5.10.

The tables in Appendix E summarize the impacts associated with the proposed route segments. These tables identify the ROW required, Land Use Impacts, Corridor Sharing, Residences, Businesses, and Environmental Resources that are along these route segments. Appendices B.1-B.3 are maps identifying the route segments along each route and the sheets of corresponding detailed route maps.

## **4.2 DISCUSSION OF 345 kV ROUTE SEGMENT ALTERNATIVES NOT USED**

Several route segment alternatives have been provided in Appendix E, which were not used in Xcel Energy's proposed routes. These segments were not used for the proposed route because they did not meet the criteria outlined above in Section 4.1 or they did not contribute to the most direct route with the least amount of impacts. Tables identifying these segments and the resources that may be impacted along these segments is summarized in Appendix E. In many instances, segments were dropped from consideration due to the close proximity to homes or sensitive environmental resources such as Wildlife Management Areas (WMA) that are known to be used by large populations of waterfowl. Please see Section 7.1.1 for a discussion of these concerns. Xcel Energy believes the two route combinations proposed in this application minimize impacts to the greatest extent. However, other routes could be created that follow any combination of the route segments presented in this application.

### **4.3 DISCUSSION OF 345 KV ROUTE SEGMENTS REJECTED**

During initial discussions with agencies about the proposed route options, one segment of the proposed route was removed from consideration due to significant concerns from the DNR about potential impacts to organisms in the area. Appendix B.27 identifies this route in relation to the proposed Route. Please see Section 7.1.1 for a discussion of these concerns. The rejected segment is located west of Lakefield and would have followed proposed Route Segment T12 for 0.5 miles south to County Road 74, where the line would have turned east for approximately three miles to the half section of Section 26 in Township 103N, Range 37W. The line would have followed the half section south for approximately 3.5 miles where it would join the beginning of the proposed Route Segment T14.

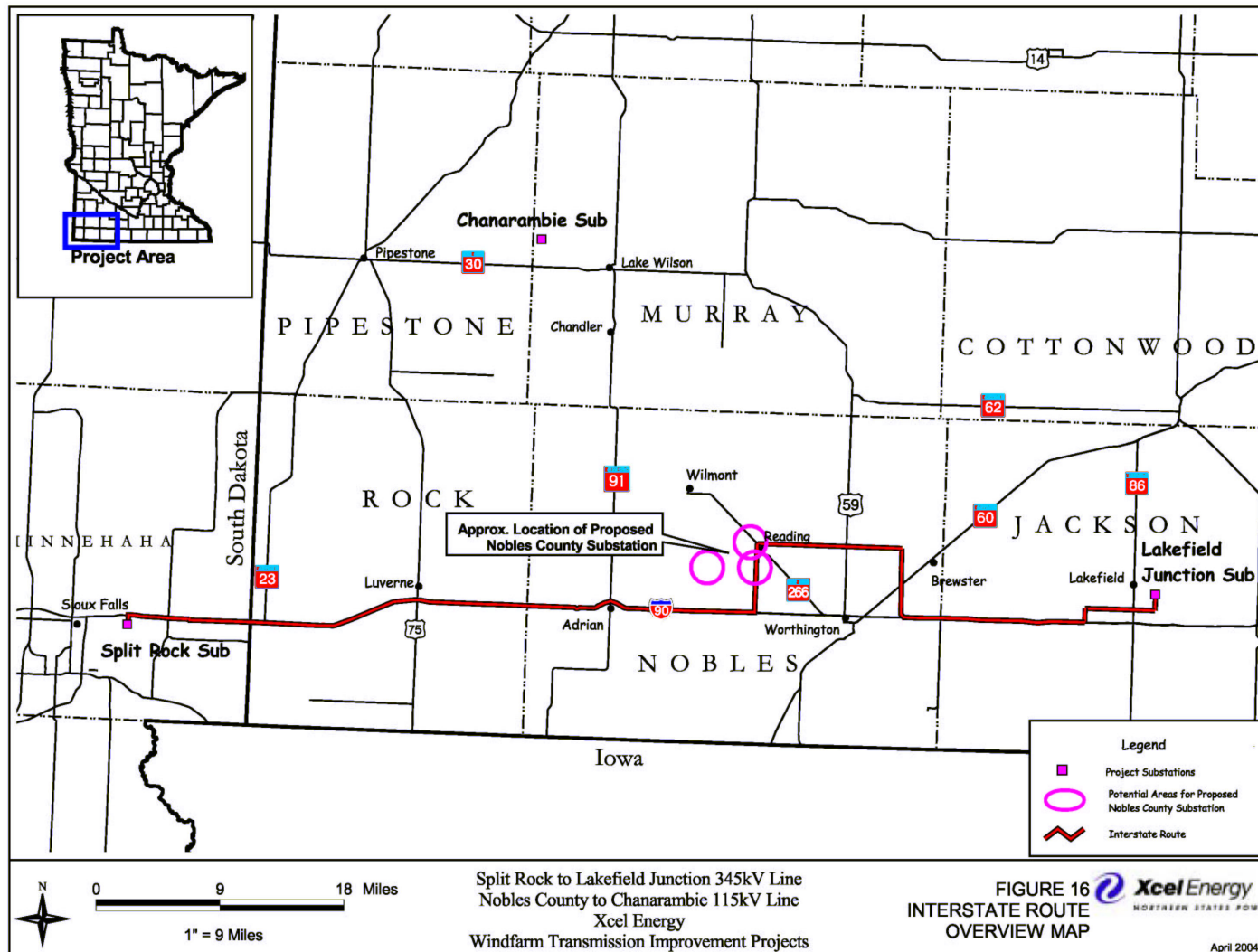
### **4.4 ROUTE 1 – INTERSTATE ROUTE**

#### **4.4.1 ROUTE DESCRIPTION**

The Interstate Route is identified on the detailed route maps identified in Appendix B.4-B.26 and an overview map Figure 16. Xcel Energy is requesting that the EQB consider the Interstate Route as described below and shown on the route maps for a route permit. The South Dakota portion of the route is included in the application, but has not been finalized. The route described here may change prior to filing the South Dakota application, based on additional input from meetings with landowners and agencies. In addition, the route in South Dakota largely depends on which Route the Minnesota EQB approves.

The Company requests that a 90-mile route be approved for the Interstate Route that has, on average, a 660-foot width from the centerline of the designated route (a total corridor width of 1320 feet). This will give Xcel Energy reasonable flexibility in locating the transmission line. This 660-foot width has been identified on the segment maps in Appendices B.4 to B.26. There are some segments where additional area is shown due to foreseen difficulties in these areas. Actual ROW acquired from landowners for the project will range from 80 to 150 feet depending upon where the line is located. Although not depicted on the maps, Xcel Energy would route the line around intersections, except in cases of hardship. The intersection of U.S. 75 and I-90 near Luverne is an example of where Xcel Energy will work with MN/DOT on the issue and may request approval for a crossing in this area due to hardship conditions.

**FIGURE 16  
INTERSTATE ROUTE OVERVIEW MAP**



This route uses single circuit, steel pole structures that would parallel I-90 for a majority of the route. The route begins at the Split Rock Substation west of Brandon, SD. Approximately 9.7 miles of the route is in South Dakota; the remaining length is in Minnesota, and is the portion of the route that is being considered in this application for approval for a route permit from the EQB.

The route has been broken up into segments in order to describe the route. Segments included in the Interstate Route to and from Substations A and B include: I1, I2, I3, I4, I5, I6, T9, T10, C5, I8, I9, C7, T14, T15, and T11. If Substation C were chosen, segments C4 and T8 would be added and segment I6 would be removed from the route described above. Below is a description of the route by segment starting on the western end of the route.

**I1** begins at the Split Rock Substation in South Dakota. The line exits the substation north, crossing the Big Sioux River west of Brandon. The line will cross I-90 and will follow the north side of the Interstate for approximately three miles. Segment I1 ends 2400 feet west of Highway 11 in Brandon, SD.

**I2** is two miles long and follows the north side of the Interstate. The transmission line will likely cross through the intersection at Highway 11 and I-90, north of Brandon. It will continue east, crossing Split Rock Creek, and following interstate ROW adjacent to agricultural fields for 2.5 miles.

**I3** begins 2.5 miles east of 486<sup>th</sup> Street. Continuing east, the transmission line will cross to the south side of the interstate at the beginning of I3. It will then follow the Interstate ROW passing through farm fields, until the Minnesota and South Dakota state border. Approximately 2900 feet from the border, the line will likely deviate south following the edge of the Minnesota Rest Area and Beaver Creek Travel Information Center.

**I4** begins at the Minnesota and South Dakota Border. The line will continue east along the south side of the interstate, passing Springwater Creek just east of the junction of I-90 and T.H. 23. The transmission line will cross through this intersection, following the interstate for two miles where it crosses Beaver Creek. The town of Beaver Creek is just past the intersection of CSAH 4 and I-90. The transmission line will likely be routed through this intersection as well as the intersection of CSAH 6 and I-90 east of Beaver Creek. The line continues east toward Luverne, crossing small, farmed drainages and agricultural land. This segment ends just east of Luverne, two miles east of CSAH 11 near the Gold'n Plump facility and the 115 kV line west of Luverne.

**I5** begins at the 115 kV line that runs north-south on the west side of Luverne. Along the south side of the Interstate, the line will cross areas near businesses associated with highway services. The line will then continue east, crossing the Rock River east of Luverne. Approximately four miles east of Luverne, the line will cross Elk Creek, and will continue east crossing through the intersection of CSAH 3 and I-90 near Magnolia. One mile east of Magnolia, the line will cross from Rock County into Nobles County. Approximately 4.5 miles east of Magnolia, the line will deviate south slightly to avoid impacting the Adrian East Rest Area, west of Adrian. It will cross Kanaranzi Creek, and just past the 69 kV line west of Adrian, the line will switch to the north side of the interstate to avoid impacting resources in Adrian. The line can double circuit with the 69 kV line to avoid the intersection of T.H. 91 and I-90. Once past the intersection, the line will continue east as a single circuit line, along the northern edge of the highway ROW, for 5.5 miles. I5 ends at segment C4, where the line would deviate north for three miles to reach Substation C, if that substation site was chosen. Otherwise, the route would continue along the northern edge of the interstate along I6.

**I6** begins approximately 2500 feet west of CSAH 13. The line will deviate north to avoid the intersection of CSAH 13 and I-90, since there is not much room for poles to be placed in this intersection. The line will continue east along the north side of the highway ROW on agricultural land, and 1.5 miles east of County Road 61, the line will be routed around Worthington, MN due to siting concerns related to the airport and the need to connect with the Nobles County Substation near Reading, MN. I6 goes north toward Substations A and B for approximately 3.2 miles along the half section west of CSAH 9. At this point, I6 meets Substation B.

**T9** begins at the Substation B location along the half section west of CSAH 9 where it will begin double circuiting with the existing 161 kV transmission line. This segment of the route is 1.7 miles long and crosses CSAH 14, near Reading, Minnesota, one mile north of the Substation B site. The line continues north, crossing an old railroad bed and T.H. 266. Northeast of Reading, near T.H. 266 is the location of Substation A. It is at this location where the Interstate Route continues east to avoid Worthington.

**T10** continues east following the existing 161 kV ROW north of Reading. The line currently crosses agricultural land along the half section south of 190<sup>th</sup> Street. The line is approximately 2.9 miles north of the Worthington Municipal Airport and follows the Alliant Route for 10.5 miles. Along T10, the line will cross Judicial Ditch 8, Elk Creek, and three unnamed tributaries of Elk Creek. This segment ends at Town Avenue.

**C5** follows Town Avenue south for one mile. The Interstate Route will continue south to meet up with the Interstate. Along C5, the line will follow the east side of the road to avoid a residence on the west side of the road.

**I8** begins at the junction of Town Avenue and CSAH 14. The line will follow the east side of the road for 4.5 miles. The line will cross T.H. 60, southwest of Brewster. Just south of T.H. 60 Town Avenue becomes a minimum maintenance road for approximately one mile. After crossing CSAH 18, the line becomes Town Avenue/County Road 3 for 1.5 miles until it reaches I-90. To avoid the home at I-90 and County Road 3, after crossing Okabena Creek the line will cross a farm field southeast, and will meet the north side of I-90 approximately 1400 feet east of the intersection of County Road 3 and I-90. I8 will continue east along the north side of I-90, crossing the CSAH 1 at the Nobles and Jackson County border. After crossing the county border, the line will continue east 7.5 miles, crossing CSAH 5 and CSAH 9 and many agricultural fields, ending 0.5 miles east of CSAH 9.

**I9** continues along the north side of I-90. It will cross a large wetland complex that is associated with the Little Sioux River. This section of the route is approximately three miles long.

**C7** is a one-mile segment along the half section west of 42X<sup>th</sup> Avenue that brings the line north. The line deviates one mile north to avoid the Summers WMA and the Nauerth airstrip, which are located south of the route near I-90. The line will likely double circuit with the 161 kV transmission line that comes north from Wisdom. The line crosses County Ditch 11 approximately 2000 feet north of I-90. The segment ends at the existing Alliant Line where it will continue east toward Lakefield Junction Substation.

**T14** is the segment where the line turns east for four miles, and ends 0.5 miles east of T.H. 86. The line double circuits with the existing Alliant ROW through agricultural fields. The line crosses County Road 7, County Road 67 and T.H. 86. As the line crosses T.H. 86, it runs adjacent to local Lakefield businesses. This segment ends approximately 0.5 miles east of T.H. 86.

**T15 and T11** are the segments used to enter the Lakefield Junction Substation. T15 continues along the existing Alliant Line, double circuiting the entire 2.2 miles across agricultural fields and an unnamed intermittent stream. T11 begins 0.5 miles east of 460<sup>th</sup> Avenue and will double circuit with the existing 161 kV transmission line that currently enters the Lakefield Junction Substation from the south. This segment is approximately 1.1 miles and follows the existing transmission line corridor that is present south of the Lakefield Junction Substation.

#### **4.4.2 DESCRIPTION OF ENVIRONMENTAL SETTING**

The Project is in the region of southwest Minnesota that lies within the Prairie Grassland region of Minnesota. The Minnesota Department of Natural Resources (DNR) has classified the Project area as the Inner Coteau (also known as Buffalo Ridge) and Coteau Moraines subsections of the Prairie Parkland Province under the Ecological Classification System (ECS). The Inner Coteau and Coteau Moraines are landscapes resulting from the glaciations and are characterized by gently rolling hills, streams, rivers, and shallow prairie lakes and wetlands. The topography along the Interstate Route is relatively level to sloping land ranging in elevation between 1389 to 1743 feet above mean sea level (AMSL).

Presettlement vegetation was tallgrass prairie. The primary present day land use is for agricultural purposes. There are few remnants of native vegetation remaining. Many of the small lakes, streams, and wetlands in the region have been drained for agricultural purposes.

The majority of the Interstate Route crosses cropland adjacent to the interstate that is mainly used to grow corn and soybeans. Communities near the Interstate Route are primarily small farming communities. There are also a few WMAs located near the line, but none are immediately adjacent. Also, there are several wetlands scattered throughout the landscape. There are a few forested areas in the region and are primarily located near homesteads.

#### **4.4.3 HUMAN SETTLEMENT**

##### **4.4.3.1 Public Health and Safety**

Proper safeguards will be implemented for construction and operation of the facility. The Project will be designed with the local, state, NESC and Xcel Energy standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials and ROW widths. Xcel Energy construction crews and/or contract crews will comply with local, state, NESC and Xcel Energy standards regarding installation of facilities and standard construction practices. Established Xcel Energy and industry safety procedures will be followed during and after installation of the transmission line. This will include clear signage during all construction activities.

The proposed transmission line will be equipped with protective devices to safeguard the public from the transmission line if an accident occurs and a structure or conductor falls to the ground. The protective devices are breakers and relays located where the line connects to the substation. The protective equipment will de-energize the line should such an event occur. In addition, the substation facility will be fenced and access limited to authorized personnel. The costs

associated with these measures have not been tabulated separately from the overall Project costs since these measures are standard practice for Xcel Energy.

#### **4.4.3.2 Commercial, Industrial, Residential Land Use**

Zoning information was obtained for the counties and cities along the Interstate Route (Appendix F). Rock, Nobles, and Jackson Counties' land uses are primarily agriculture. In Rock County, the transmission line will generally follow areas zoned "Limited Ag Districts" (A-1) along I-90. Additional land uses along the Project corridor in Rock County include "General" Industrial District, Inc. Communities, "Highway Service" Business District (B-1), and areas "Under Orderly Annexation Agreements". Zoning for areas "Under Orderly Annexation Agreement" near Luverne is determined by the City and not by the County. These areas are classified into three districts: Residential Agricultural District (RA); General Agricultural District (GA); and, Commercial Agricultural District (CA). The area north of I-90 and east of U.S.75 is designated CA under the ordinances. All other areas are GA, with the exception of areas within 1,000 feet of the boundaries of Residential Districts R-1 or R-2 in the City of Luverne. Additionally, the line will cross over Shoreland Areas at Spring Water Creek, Beaver Creek, Rock River and Elk Creek.

Nobles County is primarily zoned "Agricultural Preservation" (AG) along much of the route. In Adrian and north of Rushmore the line will cross areas zoned "Highway Business" (B-1). Along the route in Jackson County, the line crosses areas zoned "Agricultural Preservation." The line runs adjacent to areas zoned "General Industry", General Business", an "Urban/Rural Residential" near Lakefield.

Cities along the Interstate Route include Luverne, Beaver Creek, Magnolia, Adrian, Brewster, Reading, Rushmore, Worthington, and Lakefield. The transmission line will not cross or be immediately adjacent to areas zoned within the city limits of Magnolia, Worthington, Lakefield, Reading, Rushmore, or Brewster. In Luverne, the line will run adjacent to areas zoned "Highway Service Business District" and "Residential-Agricultural District." The Comprehensive Plan in Luverne is currently being revised and no changes to these land uses are anticipated. Businesses near the interstate in Luverne include highway services such as gas, hotels and restaurants. Other businesses include agricultural supply, stainless steel trucking containers, and a car dealership. On the south side of the interstate near the intersection of U.S. 75 and Interstate 90 in Luverne, there is a hotel, restaurant, meat market, storage facility, and residences. There was one billboard identified on the south side of the interstate near Luverne, whereas nine billboards were identified on the north side.

The line will be routed on the south side of the Interstate near Beaver Creek, since it is located on the north side of the Interstate. There are no businesses or homes on the south side of the interstate in Beaver Creek. On the north side of the interstate, a school, homes, and gas station are within 200 feet of the highway ROW. A new development of large homes is located just behind the gas station and is associated with the new Beaver Creek Golf Course.

In Adrian, the transmission line will cross near businesses on the south side of the Interstate. These businesses include a gas station, garden center, and miscellaneous local businesses. A campground and ballpark are located near the Interstate on the south side. More information on the campground can be found in Section 4.4.3.8.

The Interstate Route will run immediately adjacent to an area zoned “industrial” in Brewster. This area currently has a soybean processing facility owned by Minnesota Soybean Processors (MnSP). A biodiesel facility is planned immediately south of the soybean facility. No conflicts are anticipated.

Near Lakefield, the line will cross near a truck repair business and supper club along T14. If the MF1 route is chosen into Lakefield Junction Substation, the line will cross just south of an anhydrous ammonia facility.

The overall impacts to land use by the Interstate Route are identified in Appendix E. This table represents data collected by the Minnesota Land Management Information Center (LMIC) for the *International Coalition Land Use/Land Cover* project in Minnesota. A definition of these land uses is also included in Appendix G.

#### **4.4.3.3 Displacement**

There are no homes along the Interstate Route that meet the threshold for displacement due to the construction of the transmission line. All five of the homes within 300 feet of the ROW are greater than 100 feet from the proposed transmission line. However, since the route is a 345 kV transmission line, there may be instances where property is purchased by Xcel Energy per Minnesota Statute 116C.63, Subdivision 4 (sometimes referred to as “Buy the Farm”). This allows the property owner the option of having Xcel Energy purchase the property that the transmission line crosses, for the fair market value of the land. This option is the landowner’s choice and it is difficult to determine which farmers, if any, will elect it.

#### **4.4.3.4 Noise**

Noise is comprised of a variety of sounds of different intensities, across the entire frequency spectrum. Humans perceive sound when sound pressure waves encounter the auditory

components in the ear. These components convert these pressure waves into perceivable sound. Transmission conductors and transformers at substations produce noise under certain conditions. The level of noise or its loudness depends on conductor conditions, voltage level, and weather conditions. Noise emission from a transmission line occurs during heavy rain and wet conductor conditions. In foggy, damp, or rainy weather conditions, power lines can create a subtle crackling sound due to the small amount of the electricity ionizing the moist air near the wires. During heavy rain the general background noise level is usually greater than the noise from a transmission line. In addition, very few people are out near the transmission line. For these reasons audible noise is not noticeable during heavy rain. During light rain, dense fog, snow, and other times when there is moisture in the air, the proposed transmission lines will produce audible noise higher than rural background levels but similar to household background levels. During dry weather, audible noise from transmission lines is an imperceptible, sporadic crackling sound.

Noise is measured in units of decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more “weight.” The A-weighted (dBA) scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA, the A-weighted sound level recorded in units of decibels. A noise level change of 3 dBA is imperceptible to human hearing. A 5-dBA change in noise level, however, is clearly noticeable. A 10-dBA change in noise levels is perceived as a doubling of noise loudness, while a 20-dBA change is considered a dramatic change in loudness. Table 8 shows noise levels associated with common, everyday sources, and places the magnitude of noise levels discussed here in context.

Minnesota Rule 7030.0040 establishes standards to regulate noise levels by land use types. Land uses such as picnic areas, churches or commercial land are assigned to an activity category based on the type of activities occurring in each respective land use. Activity categories are then sorted based on their sensitivity to traffic noise. The Noise Area Classification (NAC) is listed in the MPCA noise regulations (Minnesota Rule 7030.0050) to define the categories. Table 9 below identifies the established noise standards for daytime and nighttime grouped by NAC.

**TABLE 8**  
**COMMON NOISE SOURCES AND LEVELS**

Sound Pressure Level (dB)	Typical Sources
120	Jet aircraft takeoff at 100 feet
110	Same aircraft at 400 feet
90	Motorcycle at 25 feet
80	Garbage disposal
70	City street corner
60	Conversational speech
50	Typical office
40	Living room (without TV)
30	Quiet bedroom at night

Source: Environmental Impact Analysis Handbook, ed. By Rau and Wooten, 1980

**TABLE 9**  
**NOISE STANDARDS BY NOISE AREA CLASSIFICATION**

Noise Area Classification	Daytime		Nighttime	
	L <sub>50</sub>	L <sub>10</sub>	L <sub>50</sub>	L <sub>10</sub>
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

Residences are the nearest receptors to the substations and would fall under NAC 1. The nearest residence to the transmission line is 135 feet away.

#### 4.4.3.5 Aesthetics

The proposed structures for the 345 kV transmission line will be single circuit, steel pole structures spaced approximately 950 feet apart. The new structures will be between 120 and 140 feet in height. Xcel Energy considered using H-frame structures, which would have been shorter, but are wider and utilize two poles. However, this would increase impacts on farming activities. Depending on the substation site chosen, approximately three miles of the route will require ROW that does not parallel an existing corridor. This is necessary to connect the Interstate Route to Substations A and B. If Substation C is chosen, three miles of new ROW will be necessary along C4. This portion of the route will span agricultural areas along the half-

section line to access Substation C. The remaining portions of the route will follow the existing highway, county/township roads, and transmission line corridors.

The proposed line will be a contrast to the open agricultural areas and may be visible to travelers along I-90 and to residents of Beaver Creek, Luverne, Magnolia, Adrian, eastern Worthington, Brewster, Lakefield, and to township residents along the route. However, the degree to which the poles are visible will vary from town to town, and depends upon the proximity of the line to each town.

#### 4.4.3.6 Socioeconomic

There are nine communities near the Interstate Route: Beaver Creek, Luverne, Magnolia, Adrian, Rushmore, Reading, Worthington, Brewster, and Lakefield. A summary of county and community population and economic characteristics, based on the 2000 U.S. Census, is below in Table 10.

**TABLE 10**  
**POPULATION AND ECONOMIC CHARACTERISTICS**

Location	Population	Per Capita Income	Percent of Population below Poverty Level
<b>Rock County</b>	<b>9,721</b>	<b>\$17,411</b>	<b>8.0%</b>
Beaver Creek	250	\$14,924	6.7%
Luverne	4,617	\$18,692	5.7%
Magnolia	221	\$13,427	5.2%
<b>Nobles County</b>	<b>20,832</b>	<b>\$16,987</b>	<b>11.7%</b>
Adrian	1,247	\$16,925	3.5%
Brewster	502	\$16,263	6.5%
Reading <sup>1</sup>	–	–	–
Rushmore	376	\$14,216	2.8%
Worthington	11,283	\$18,078	9.1%
<b>Jackson County</b>	<b>11,268</b>	<b>\$17,499</b>	<b>8.6%</b>
Lakefield	1,721	\$16,003	5.5%

1. No Census data was available for Reading, Minnesota

According to the 2000 U.S. Census, approximately 97.3 percent of the population in Rock County is white, in Nobles County 86.5 percent of the population is white, and in Jackson County 97.1 percent of the population is white. No community within the project area contains disproportionately high minority populations or low-income populations.

Historically, the largest economy of this area of Minnesota was agriculture. In many communities agriculture continues to be the largest industry. While manufacturing has become a large contributor to the economy of southwest Minnesota, the economy of many of the townships that the line passes through still are anchored in agriculture. Table 11 lists the leading industries in each county within the project corridor, based on the 2000 U.S. Census.

**TABLE 11**  
**LEADING COUNTY INDUSTRIES**

County	Industry	Percent of Workforce
Rock	Educational, health and social services	21.7
	Agriculture, forestry, fishing and hunting, and mining	13.0
	Manufacturing	12.1
Nobles	Manufacturing	21.3
	Educational, health and social services	18.6
	Retail Trade	13.2
Jackson	Educational, health and social services	19.1
	Manufacturing	18.5
	Agriculture, forestry, fishing and hunting, and mining	13.3

#### 4.4.3.7 Cultural Values

Cultural values include those perceived community beliefs or attitudes in a given area that provide a framework for each social group's unity. The communities along the project corridor value their pioneer roots and the history surrounding their settlement on the prairie. Minnesotans can reconnect with the history of the prairie by enjoying the Prairie Passageway route. This route passes through the region of Minnesota that was once covered in tallgrass prairie. In western Minnesota, the route follows U.S. Highway 75 and T.H. 23 south to I-90. Just south of Blue Mounds State Park the trail continues east, following I-90 until it connects with I-35 where it continues on a southern route into Iowa and eventually into Texas.

The goal of the Prairie Passageway program is to protect and promote awareness of the remaining native grasses and wildflowers along roadside right-of-ways, to plant and restore native grasses and wildflowers and to explain the history of the prairie in relation to the Native Americans and early settlers who inhabited the area. Prairie Passageway sites include state parks, scientific and natural areas, historic battlefields, wildlife management areas and archaeological

sites. Informational kiosks area located near Luverne and Marshall and at Blue Mounds and Camden State Parks.

The communities of Brandon, Beaver Creek, Luverne, Magnolia, Adrian, Rushmore, Reading and Brewster are all within close proximity of the Interstate Route. The economies of these areas depend mostly on agricultural (livestock, poultry, dairy and grain) and manufacturing (fertilizer, motor vehicle parts, feeds and concrete) opportunities. Attractions include Blue Mounds State Park, located just north of Luverne. The park features a Sioux quartzite cliff, a bison herd and prairie grasses and flowers. The route will not pass through this park.

#### **4.4.3.8 Recreation**

Recreational opportunities are abundant throughout the project corridor for the residents and visitors to Rock, Nobles, and Jackson Counties. City facilities along the project corridor, USFWS Waterfowl Production Areas (WPAs) and State Wildlife Management Areas (WMAs) provide a majority of the recreational opportunities in the project vicinity. State WMAs provide habitat for game and non-game animals and also provide recreational opportunities for hunters and wildlife watchers. WPAs are Federally managed wetlands and surrounding uplands open to hunting and wildlife watching. These lands are purchased and managed by the USFWS to provide high quality wetlands and nesting cover for waterfowl and other species of wildlife.

Hunting opportunities in Rock County are available at the Rock River and P.F. Mulder WMAs, which are 1.5 miles north and south of the Interstate Route, respectively. The City of Luverne provides many facilities for additional recreational activities such as golfing at the Luverne Country Club, archery and hunting at the Rock County Sportsmen Club, as well as several City parks and sports fields. Cedric Adams Park is on the north side of the City of Magnolia approximately 0.5 miles from Segment I5.

There are two WMAs, Adrian Spring County Park, and Adrian Lower Park within the project corridor in Nobles County. The two WMAs within two miles of the route (Bluebird Prairie and Herlein-Boote) allow hunting and hiking on the properties. Adrian Spring County Park was historically a roadside rest area with a spring that was used to provide water for travelers and local residents. Adrian Lower Park has a campground with swimming and picnicking facilities, and is located adjacent to I-90.

In Jackson County, there are two WMAs and two WPAs near the Interstate Route. Summers WMA provides hunting, wildlife watching and hiking opportunities. Summers WMA is located one mile south of the Interstate Route. Ninneman and Ulbricht WPAs are located near the

Interstate Route. Ninneman is 400 feet north of segment I9 along the Interstate Route. Ulbricht is 0.5 miles south of segment I9 near the Interstate Route. Maps identifying WMAs and WPAs along the route are in Appendix B.4 to B.26.

Table 12 summarizes the WMAs along the Interstate Route:

**TABLE 12**  
**WMA ALONG INTERSTATE ROUTE**

County	WMA	Distance to Route (miles)	Size (Acres)
Rock	Rock River	1.5	420.8
	P.F. Mulder	1.5	86.5
Nobles	Bluebird Prairie	1.9	77.5
	Herlein-Boote	0.5	561.0
Jackson	Summers	1.0	164.8

#### 4.4.3.9 Public Services

Many of the public services available to residents in Rock, Nobles, and Jackson counties are associated with the larger cities in the project corridor. There are ten communities within the immediate vicinity of the proposed project: Beaver Creek, Luverne, Magnolia, Adrian, Rushmore, Reading, Worthington, Brewster, Okabena and Lakefield. Worthington is the largest of the cities within the project area, followed by Luverne. Each community offers typical public services such as electricity, natural gas, water, wastewater treatment (some communities only have septic systems), cable television and telephone. The local rural water districts primarily service individuals outside of city areas and electric services are provided by electrical cooperatives. The Nobles Cooperative Electric provides electricity and television service to some residents of Nobles and Murray Counties.

Worthington is located in Nobles County and offers many amenities for the public. Taxi and bus services are available as local transportation. The municipal airport serves charter and commercial flights. Impacts to this airport were considered during the siting of the 345 kV line, and the current route follows a corridor far enough north where it would not be within air obstruction zones. A local library system is also available to the community.

Luverne, which is located in Rock County, has a municipal airport, volunteer fire department, libraries, and bus services. The Luverne Municipal airport lies south of I-90 in Luverne. The airport has an “Air Space Obstruction Zoning” ordinance available through the City of Luverne. According to the zoning requirements, the proposed project will not be within the air obstruction zones.

#### **4.4.3.10 Impacts and Mitigation for Interstate Route – Human Settlement**

##### **Commercial, Industrial, Residential Land Use**

All land uses crossed by the Interstate route have the potential to be impacted by the proposed route. Land Use impacts were determined using the LMIC International Coalition Land Use/Land Cover project information. Along the Interstate Route, approximately 0.39 acres of agricultural land and 0.21 acres of grassland will be impacted permanently due to the construction of the transmission line (Appendix E). Temporary construction impacts to all land uses will be approximately 210 acres, and is described in more detail in Appendix E.

Impacts to Land Uses were minimized by using single, steel poles, which will minimize impacts to agriculture, the primary land use along the route. The utilization of existing linear corridors also helps to minimize impacts to land uses along the route.

##### **Noise**

The noise levels from the proposed line are comparable to the existing noise environment and will not have a significant impact on humans or the environment. Corona on transmission line conductors can generate electromagnetic noise at the frequencies at which radio and television signals are transmitted. This noise can cause interference (primarily with AM radio stations and the video portion of TV signals) with the reception of these signals depending on the frequency and strength of the radio and television signal. Although radio and television interference sometimes occurs, Xcel Energy investigates all such problems and corrects those problems caused by Xcel Energy facilities. Xcel Energy does not expect that there will be any impacts from the operation of the new line.

The line will be routed along existing disturbed corridors and will also be routed to minimize impacts to homes along the route. No additional mitigative measures are necessary since there will be nominal corona or noise impacts from the transmission lines and existing substations.

### **Aesthetics**

Impacts to aesthetics should be minimal due to the use of existing corridors. Approximately 90% percent of the route will utilize existing corridors. This route is already impacted by the presence of I-90. Xcel Energy has not identified any aesthetic resources that would be impacted by this transmission line.

Although the line will be a contrast to surrounding land uses, Xcel Energy has identified routes that utilize existing corridors and avoid homes to the greatest extent practicable. Xcel Energy will work with landowners to identify concerns related to the transmission line and aesthetics.

### **Socioeconomic**

Short-term impacts to socioeconomic resources will be relatively minor. The construction, operation and maintenance of the transmission line will not have a significant effect on socioeconomic resources along the route.

The relatively short-term nature of the Project construction and the number of workers who will be hired from outside of the Project area should result in short-term positive economic impacts in the form of increased spending on lodging, meals and other consumer goods and services. It is not anticipated that the Project will create new permanent jobs, but it will create temporary construction jobs that will provide a one-time influx of income to the area. Table 13 summarizes the number of people Xcel Energy estimates will work on this project.

**TABLE 13  
ESTIMATED NUMBERS OF WORKERS FOR CONSTRUCTION  
OF THE 345 KV TRANSMISSION LINE**

Type of Work	Number of Employees	Comments
Land Rights	4	
Survey	4	
Construction – Foundations	12-16	
Construction – Poles	35-40	
Construction – Substation	8-12	
Office Personnel	4	Infrequent Visits

There will also be some long-term beneficial impacts from the new lines. These benefits include an increase to the counties' tax base resulting from the incremental increase in revenues from utility property taxes, which are based on the value of the Project. The availability of reliable power in the area will have a positive effect on local businesses and the quality of service provided to the general public. This transmission line will improve the capability of local wind generators to transport energy generated in the region. This in turn may increase the amount of wind development in the area and will contribute to the local economy through easement dollars and taxes generated due to wind farm construction and operation. The establishment of this area of Minnesota as an important producer of alternative energy sources, primarily wind, may also spur the development of wind-related businesses in the area, in turn contributing to economic growth in the region.

The development of wind energy in this region has been important in diversifying and strengthening the economic base of southwestern Minnesota. Northwest Economic Associates prepared a report, "Assessing the Economic Development Impacts of Wind Power," that includes a case study of the Lake Benton I wind project in Lincoln County, Minnesota. The study stated that the construction phase of Lake Benton supported a total of eight jobs and \$98,000 in personal income primarily in the trade and services industries. During the operation and maintenance phase of Lake Benton I, a total of 31 jobs, primarily in the transportation, communication and public utilities industries, supported \$909,000 in annual personal income in Lincoln County.

This analysis by Northwest Economic Associates discusses the limited amount of local accommodations available in Lincoln County. As a result, Lincoln County may not have been able to capture as much of the non-resident expenditures as surrounding counties due to a lack of services available. Also, many of the direct effects on the Lincoln County economy were due to expenditures made by non-residents and income received by resident workers benefiting from the construction of the turbines. The effects of surrounding counties has not been analyzed. However, it is likely that larger towns near Lake Benton, such as Pipestone and Marshall, may have indirectly benefited from the construction of Lake Benton I.

The Lake Benton I wind facility is designed for 20 years of operation. The employment sectors affected by the Lake Benton I wind development are in trade and service. In addition to the creation of jobs and personal income, the development generated \$611,200 in county property taxes in 2000, representing thirteen percent of the property taxes collected in Lincoln County.

The Minnesota Wind Project estimates that each 100 MW of new wind development in southwest Minnesota could be expected to generate about \$250,000 per year in direct lease payments to landowners. Property taxes on wind facilities are changing as a result of tax changes enacted in 2002 by the State legislature. For example, a 100 MW wind facility will generate approximately \$370,000 in tax revenue for the entire life of the project.

If local contractors are used for portions of the construction, total wages and salaries paid to contractors and workers in Jackson, Nobles, Rock, and Murray Counties will contribute to the total personal income of the region. Additional personal income will be generated for residents in both counties and the state by circulation and recirculation of dollars paid out by the applicant as business expenditures and state and local taxes.

Expenditures made for equipment, energy, fuel, operating supplies and other products and services benefit businesses in the state and the counties where the project is located. Indirect impact may occur through the increased capability of the electric system to supply energy to commercial and industrial users, which will contribute to the economic growth of the region.

Socioeconomic impacts resulting from the project will be primarily positive with an influx of wages and expenditures made at local businesses during the Project construction and increased tax revenue. Mitigative measures are not necessary.

### **Recreation**

The line will likely be visible to individuals using recreational resources within two miles of the transmission line. No direct impacts are anticipated to WMA or WPA lands. If the transmission line is routed along the south side of the Interstate, it may be necessary to place poles in the Adrian Spring County Park and Adrian Lower Park property.

Xcel Energy will work with the DNR and FWS to avoid and minimize impacts to waterfowl in WMA or WPA lands. To minimize impacts to the parks in Adrian, Xcel Energy will attempt to span these areas or place poles away from areas heavily used by park visitors. Xcel Energy will work with the City of Adrian and park owners to resolve any concerns they may have.

#### **4.4.4 LAND-BASED ECONOMIES**

##### **4.4.4.1 Agriculture**

According to the 1997 Census of Agriculture, Rock County has seen the amount of lands in farms increase in the last ten years, whereas the number of full time farms has decreased by 20 percent. In Rock County 59 percent of the agricultural products sold are livestock sales. According to the 2003 Minnesota Agricultural Statistics, approximately 152,000 head of hogs and pigs and 49,000 head of cattle were raised in the county. Sales from these livestock in 2001 were \$95,078,000, which ranks eighteenth in the State. Crops in Rock County are primarily corn and soybean.

Nobles County is also a large producer of livestock and in 2003 ranked sixth in numbers of hogs and pigs and twelfth in the number of cattle raised. Approximately \$98,316,000 in livestock sales occurred in 2001. The 2003 Minnesota Agricultural Statistics reports that Nobles County is ranked seventh in soybean production in the state. Approximately 185,700 acres of soybeans were harvested during the 2002 season. The 1997 Census of Agriculture indicates that the average size of farms in the county has increased slightly, however the number of full time farms and the amount of land in farms has decreased.

The 2003 Minnesota Agricultural Statistics ranks Jackson County as the eighth and ninth largest producers of corn and soybeans, respectively in the State. The 2002 harvest yielded 182,800 acres of corn and 168,100 acres of soybeans. Jackson County also has a large number of hogs and pigs, and is ranked ninth in the State. In the 1997 Census of Agriculture, a similar trend to Rock and Nobles County in size and number of farms was apparent. The average size of farms increased, whereas the amount of land and number of full time farms decreased.

##### **4.4.4.2 Forestry**

The proposed project corridor occurs in what was historically the prairie grassland region of Minnesota. The primary tree cover in the project area is associated with waterways and homesteads. No economically important forestry resources are within the project area.

##### **4.4.4.3 Tourism**

Much of the tourism in Rock County is primarily in Luverne, Minnesota. In Luverne there are many area attractions and historic sites. Luverne is the County seat and the Rock County Courthouse has been newly renovated. There are several historic sites of interest including the Hinkly House Museum, Holy Trinity Church, Palace Theater, Rock County Historical Museum and the Maplewood Chapel. Luverne also holds the Tri-State Band Festival, the Rock County fair, and is one of the host cities for the Border to Border Triathlon.

The primary tourist attractions and activities can be found in Worthington (i.e. Pioneer Village, Okabena Lake, WSA Sno-Cross, Nobles County Fair). In Adrian, the Spring County Park provides tourists access to a roadside camping area. Also, the Prairie Winds Zoo is just off I-90 and Highway 91. The zoo has many different exhibits including a tiger and outback exhibit. The zoo opens a new expansion in August. For information on the tourist attractions in Adrian and Lakefield, please see Section 4.4.3.8.

#### 4.4.4.4 Mining

Surficial deposits from ground and end moraines dominate the corridor. The moraines consist of silty, calcareous tills with varying concentrations of sand and gravel lenses occurring at various depths. Along the western end of the corridor, loess covers the existing moraine deposits. The thickness of the glacial deposits generally decreases from east to west along the project corridor. Thicknesses of 400 to 500 feet are present in Lakefield, while glacial cover is between 100 to 200 feet near Beaver Creek.

The primary bedrock encountered is the Sioux Quartzite. Undifferentiated crystalline rocks occur midway along the project corridor. Cretaceous rocks consisting of siltstone, shale, and sandstones, discontinuously overlay the Precambrian bedrock.

The undifferentiated crystalline rocks are composed of intermediate and mafic rocks with some granitic rocks. The Sioux Quartzite is a red and purple to light gray quartzite that is interbedded with red mudstone.

Mineral resources in the region consist of sand and gravel lenses found in the moraine deposits. The Altamont end moraine deposits cover part of the corridor near Lakefield. A higher occurrence of sand and gravel units is associated with the Altamont than what is documented in the Bemis and the ground moraine located to the west of it.

According to MN/DOT county pit maps for Jackson, Noble, and Rock Counties, there are six active gravel pits within a mile of the Interstate Route corridor. All the gravel pits lie in close vicinity of I-90, three of the gravel pits are concentrated west of Lakefield, two are north of I-90 near Adrian, and another two are southwest of Beaver Creek. A cluster of inactive pits is located south of Lakefield adjacent to I-90 and one lies just west of Brewster south of the proposed line. No commercial aggregate pits or rock quarries are found along the transmission corridor.

#### 4.4.4.5 Impacts and Mitigation for Interstate Route – Land-Based Economics

##### Agriculture

Permanent impacts will occur to farmland throughout the corridor; no impacts are anticipated to livestock operations. However, these impacts will be minimal and will occur primarily due to pole placement. During construction, temporary impacts such as soil compaction and crop damages within the ROW are likely to occur. Approximately 136 acres of agricultural land will be impacted temporarily by the proposed Project. Permanent impacts to agricultural lands are estimated at 0.39 acres for the Interstate Route. Appendix E describes the land use impacts for the route in more detail.

Wherever possible, poles will be placed so that they closely follow the I-90 ROW fence line, minimizing permanent impacts to agricultural land. To ensure minimal loss of farmland and to ensure reasonable access to the land near the poles, Xcel Energy intends to place the poles approximately five feet from the interstate and county road ROW.

When possible, Xcel Energy will attempt to construct the transmission line before crops are planted or following harvest. However, the Company will be on a tight timeline to complete this project by 2007, so it cannot be guaranteed. The Company will compensate landowners for crop damage and soil compaction that occurs as a result of the Project. Soil compaction will be addressed by compensating the farmer to repair the ground or by using contractors to come in and chisel plow the site. Normally, a declining scale of payments is set up over a period of a few years.

#### 4.4.5 ARCHAEOLOGICAL AND HISTORIC RESOURCES

Regional prehistory and history can be characterized as generally similar across the project area. The following background sections provide a very broad context for archaeological and historic sites in the region. For the purposes of this document, this context could be applied to each of the other proposed routes and substation locations. Please refer to it when reviewing other sections relevant to archaeological and historic resources. Previously recorded sites, however, are specific to each proposed route or substation location and will be considered accordingly.

During the Paleoindian period (circa 10,000 to 6,000 BCE), migratory groups of people moved into what would become Minnesota as glaciers retreated. These people were likely highly mobile, hunting large herding mammals such as elk, mammoth and now-extinct forms of large bison and also likely relied on smaller game, fish and native plants.

In the following Archaic period (circa 6000 to 800 BCE), inhabitants continued to hunt large game but appear to have been less nomadic than the Paleoindian peoples. They also developed and advanced techniques associated with hunting, trapping, fishing, foraging, woodworking and plant processing. Settlements were common along lakes and rivers.

In the Woodland period (circa 800 BCE to historic contact) plant domestication was beginning. Settlement continued to focus on bodies of water. The development of pottery and use of burial mounds occurred during this time. In the late Woodland period, most of the southern peoples in Minnesota transitioned to a way of life more typical of the Mississippian societies to the south. A primary characteristic of these Mississippian groups was the cultivation of corn. These newly emergent cultures appear to have been the predecessors of the Native Americans present at the time of first European contact.

The first Europeans to travel into southwestern Minnesota were likely French fur trappers and traders in the late 1600s or early 1700s. At the time, the primary indigenous peoples were the Dakota. Following the Treaty of Paris in 1763, control of the region passed to the British and then to the United States in 1783.

Individuals of a European background settled permanently in this region in the mid-1800s, primarily from other regions of the United States. The majority of the settlers came to farm. Following the Civil War, European immigrants and Euroamericans came to the area. Many of these immigrants were from northern European countries.

The post-Civil War settlements of Luverne and Adrian illustrate important general trends in the historic period development of the project vicinity. Luverne was a center for agricultural markets and an important rail and postal station beginning by the 1870s. Many early settlers were Civil War veterans who came to practice farming or professions to service the largely agricultural community. Similarly, Adrian was a rail station established in the 1870s by the St. Paul and Dakota Railroad Company. It shared Luverne's importance as a regional agricultural center. Also, Luverne and Adrian were and continue to be stops on major transportation routes, first the railroad and now an interstate highway.

#### **4.4.5.1 Impacts and Mitigation for Interstate Route – Archaeological and Historic Resources**

A search of the Minnesota State Historic Preservation Office (SHPO) database identified 32 historic architectural sites and eight archaeological sites within one mile of the proposed route. None of these sites are in the Project corridor. Therefore, no impacts are anticipated to previously recorded cultural resources.

Xcel Energy sent a letter to the SHPO requesting a review of the proposed project for compliance with the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act. The SHPO responded that an archaeological survey of the project was not needed. A copy of the response letter is attached in Appendix I.8.

No impacts to previously identified archaeological resources are anticipated. Archaeological probability along the Interstate Route appears relatively low and no impacts are expected; therefore, no mitigation is needed. Xcel Energy will provide the contractor with construction guidelines in relation to cultural resources. If crews discover anything that may be of cultural significance, proper procedures in protecting that resource will be outlined for the contractor.

#### **4.4.6 NATURAL ENVIRONMENT**

##### **4.4.6.1 Air Quality**

Currently, both state and federal governments have regulations regarding permissible concentrations of ozone and oxides of nitrogen. The national standard is 0.08 ppm on an eight-hour averaging period. The state standard is 0.08 ppm based upon the fourth-highest eight-hour daily maximum average in one year. Calculations using the Bonneville Power Administration (BPA) Corona and Field Effects Program Version 3 (USDOE, BPA Undated) for a standard single circuit 345 kV Project predicted the maximum concentration of 0.008 ppm near the conductor and 0.0003 ppm at one meter above ground during foul weather or worst-case conditions (rain at 4 inches per hour). During a mist rain (rain at 0.01 inch per hour) the maximum concentrations decreased to 0.0003 ppm near the conductor and 0.0001 ppm at one meter above ground level. For both cases, these conservative calculations of ozone levels are well below the federal and state standards. Studies designed to monitor the production of ozone under transmission lines have generally been unable to detect any increase due to the transmission line facility. Given this, there will be no measurable impacts relating to ozone for the Project.

During construction of the proposed transmission line and substation, there will be limited emissions from vehicles and other construction equipment and fugitive dust from ROW

clearing. Temporary air quality impacts caused by the proposed construction-related emissions are expected to occur during this phase of activity.

The magnitude of the construction emissions is influenced heavily by weather conditions and the specific construction activity occurring. Exhaust emissions from primarily diesel equipment will vary according to the phase of construction but will be minimal and temporary. Adverse impacts to the surrounding environment will be minimal because of the short and intermittent nature of the emission and dust-producing construction phases.

#### **4.4.6.2 Water Quality**

The Interstate Route passes through the Big Sioux, Rock River, Little Sioux, West Fork Des Moines and East Fork Des Moines major surface water watersheds. Individual stream and ditch crossings are listed in Table 14. The third column of the table indicates whether the body of water crossed is identified as a DNR Public Water (PWI) on the Public Waters Inventory Maps. The route is adjacent to a USFWS WPA associated with the Little Sioux River with a water basin designated as PWI 96P. Public waters are designated to indicate which lakes, wetlands and watercourses the DNR has regulatory jurisdiction. The statutory definition of public waters can be found in MN Stat. §103G.005, Subdivisions 15 and 15a.

There are several wetlands along or near the Interstate Route. Along the proposed Interstate Route the line will span 30 wetlands identified by the National Wetlands Inventory (NWI). Many of these wetlands are hydrologically connected to area rivers and streams. The wetlands identified on the NWI maps do not necessarily represent the actual wetlands subject to protection under Section 404 of the Clean Water Act and under the Minnesota Wetland Conservation Act. Both the PWI and NWI information related to the Interstate Route is identified on the maps in Appendix B.4 to B.26.

**TABLE 14**  
**WATER CROSSINGS FOR INTERSTATE ROUTE**

Segment	Waterbody Name	Public Water
I4	Springwater Creek	X
I4	Unnamed Tributaries to Beaver Creek (5)	--
I4	Beaver Creek	X
I4, I5	Unnamed Tributaries to Rock River (3)	--
I5	Unnamed Tributary to Rock River	X
I5	Rock River	X
I5	Unnamed Tributaries to Elk Creek (2)	X
I5	Elk Creek	X
I5	Unnamed Tributaries to Kanaranzi Creek (2)	--
I5	Unnamed Tributary to Kanaranzi Creek	X
I5	Kanaranzi Creek (2)	X
I5	Unnamed Intermittent Streams (2)	--
I5	Unnamed Intermittent Stream, Tributary to Kanaranzi Creek	X
I5	Unnamed Tributary to Little Rock Creek	--
I6	Unnamed Tributary Kanaranzi Creek	X
I6	Unnamed Tributary to Judicial Ditch No. 1	--
T9	County Ditch No. 5	--
T10	Judicial Ditch No. 8 (2)*	X
C5, T10	Unnamed Tributaries to Elk Creek (2)	X
I8	Unnamed Tributary to Okabena Creek	X
I8	Okabena Creek	X
I8	Judicial Ditch No. 28	X
I8	Unnamed Tributaries to Little Sioux River (2)	--
I8	Unnamed Tributaries to Little Sioux River (3)	X
I9	Little Sioux River	X
I9, I10	County Ditch No. 11 (3)	X
T15, T11	Unnamed Intermittent Streams (2)	X

(#) - Number of crossings. May indicate multiple crossings of the same stream or several streams with the same description.

\* - Only one of the crossings is a PWI.

Table 15 summarizes the MPCA “2002 MN 305(b) Report to Congress of the United States” as it pertains to the water quality of the water bodies crossed by the proposed line.

**TABLE 15**  
**SURFACE WATER QUALITY ASSESSMENT FOR INTERSTATE ROUTE**

Water Body	Aquatic Life	Swimming
Rock River	Not Supported	Partially Supported
Little Sioux River	Fully Supported	Not Assessed
Okabena Creek	Not Attainable	Not Attainable
Elk Creek	Not Assessed	Not Assessed

#### 4.4.6.3 Flora

Much of the land adjacent to I-90 and the 345 kV line is either developed or cultivated. Areas near streams and rivers, and various WMAs within the project vicinity are likely to contain native vegetation.

A majority of the vegetation surrounding the project corridor is crops planted on agricultural land and field margins populated primarily by common weeds such as brome grass (*Bromus inermis*), ragweeds (*Ambrosia spp.*), thistles (*Cirsium spp.*), stinging nettle (*Urtica dioica*) and others. This land was once a part of the prairie grassland region of Minnesota, and areas along the proposed corridor may contain prairie remnants. The project corridor is located in the southwest prairie region of Minnesota. Historically these areas will consist of dry and mesic prairies with plants such as big bluestem (*Andropogon gerardii*), prairie dropseed (*Sporobolus heterolepis*), Indiangrass (*Sorghastrum nutans*), and cordgrass (*Spartina pectinata*) intermixed with a variety of forbs. Wet prairies were historically restricted along river and stream margins.

#### 4.4.6.4 Fauna

The larger creeks in the area would have fauna indicative of riparian areas. Areas within the corridor that may provide habitat for greater concentrations of organisms are the watercourses described in Section 4.4.6.2 and the WMAs and WPAs in the area described in Section 4.4.3.8. WMAs are managed for wildlife production and are open to hunting and wildlife watching. Upland game birds and small mammals are common in these areas. There are also several WPAs within the vicinity of the Project. WPAs are Federally managed wetlands and surrounding uplands open to hunting and wildlife watching. Additionally, fallow farm fields, fencerows, and woodlots in cultivated areas also provide cover for organisms within the project corridor. A list of organisms known to occur in habitats of this region of Minnesota are included as Appendix H.

#### **4.4.6.5 Impacts and Mitigation for Interstate Route – Natural Environment**

##### **Air Quality**

Currently, both state and federal governments have regulations regarding permissible concentrations of ozone and oxides of nitrogen. The national standard is 0.08 ppm on an eight-hour averaging period. The state standard is 0.08 ppm based upon the fourth-highest eight-hour daily maximum average in one year. Calculations using the Bonneville Power Administration (BPA) Corona and Field Effects Program Version 3 (USDOE, BPA Undated) for a standard single circuit 345 kV Project predicted the maximum concentration of 0.008 ppm near the conductor and 0.0003 ppm at one meter above ground during foul weather or worst-case conditions (rain at 4 inches per hour). During a mist rain (rain at 0.01 inch per hour) the maximum concentrations decreased to 0.0003 ppm near the conductor and 0.0001 ppm at one meter above ground level. For both cases, these conservative calculations of ozone levels are well below the federal and state standards. Studies designed to monitor the production of ozone under transmission lines have generally been unable to detect any increase due to the transmission line facility. Given this, there will be no measurable impacts relating to ozone for the Project.

During construction of the proposed transmission line and substation, there will be limited emissions from vehicles and other construction equipment and fugitive dust from ROW clearing. Temporary air quality impacts caused by the proposed construction-related emissions are expected to occur during this phase of activity.

The magnitude of the construction emissions is influenced heavily by weather conditions and the specific construction activity occurring. Exhaust emissions from primarily diesel equipment will vary according to the phase of construction but will be minimal and temporary. Adverse impacts to the surrounding environment will be minimal because of the short and intermittent nature of the emission and dust-producing construction phases.

##### **Water Quality**

During construction there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading and construction traffic. However, once the project is completed, it will have no impact on surface water quality.

Temporary impacts to wetlands may occur if these areas need to be crossed during construction of the transmission line. Permanent impacts to wetlands are possible at Segment T9. Xcel Energy will attempt to span the wetland at Segment T9 and other wetlands along the route.

However, due to the width of the wetland along T9, spanning it may not be an option. If this is the case, it is anticipated that one pole will need to be placed in the wetland, which equates to approximately 60 ft<sup>2</sup> of impact.

Xcel Energy will maintain sound water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil and stabilizing restored soil. The Company will avoid major disturbance of individual wetlands and drainage systems during construction. This will be done by spanning wetlands and drainage systems where possible. When is not possible to span the wetland, Xcel Energy will draw on several options during construction to minimize impacts:

- 1) When possible, construction will be scheduled during frozen ground conditions.
- 2) Crews will attempt to access the wetland with the least amount of physical impact to the wetland (i.e. shortest route).
- 3) The structures will be assembled on upland areas before they are brought to the site for installation.
- 4) When construction during winter is not possible, wooden mats will be used where wetlands would be impacted.
- 5) A final method to reduce impacts to wetlands is to use helicopters to access the site. That option will not be utilized for this project. Since it is expensive, it is only used in cases of large, remote wetlands that are difficult to access and winter construction cannot be scheduled.

### **Flora**

Since the Project will occur along roads and agricultural lands and urban areas that have been previously disturbed, no impacts are anticipated to native vegetation. Efforts will be made to assure that any identified prairie remnants and threatened and endangered species discussed in Section 4.4.7 will be avoided near the route.

Xcel Energy will minimize tree felling and shrub removal by only removing vegetation that would impact the safe operation of the facility. Additionally, Xcel Energy will maintain sound

water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent water resources and minimize soil erosion (See Water Quality Above).

### **Fauna**

There is minimal potential for the displacement of wildlife and loss of habitat from construction of the Project. Wildlife that inhabits natural areas such as those near waterbodies could be impacted in the short term within the immediate area of construction. The distance that animals will be displaced will depend on the species. Impacts to wildlife are anticipated to be short-term since the route primarily will be constructed along an existing interstate and county road ROW. Additionally, these animals will be typical of those found in agricultural and urban settings, and should not incur population level effects due to construction.

Raptors, waterfowl and other bird species may also be affected by the construction and placement of the transmission lines. Avian collisions are a possibility after the completion of the transmission line. Waterfowl are typically more susceptible to transmission line collision, especially if the line is placed between agricultural fields that serve as feeding areas, or between wetlands and open water, which serve as resting areas.

Additionally, electrocution of large birds, such as raptors, is a concern related to distribution lines. Electrocution occurs when birds with large wingspans come in contact with either two conductors or a conductor and a grounding device. Xcel Energy transmission line design standards provide adequate spacing to eliminate the risk of raptor electrocution. As such, electrocution is not a concern related to the proposed Project.

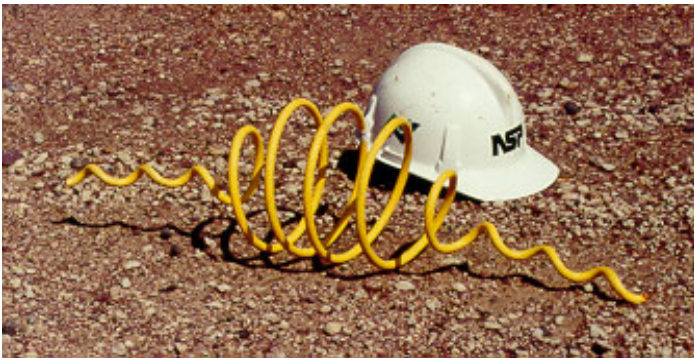
Xcel Energy has been working with various state and federal agencies over the past twenty years to address these issues. Company personnel work to address problem areas as quickly and efficiently as possible. In 2002, Xcel Energy, Inc.'s operating companies including Xcel Energy, entered into a voluntary memorandum of understanding (MOU) to work together to address avian issues throughout its territory. This includes the development of avian protection plans (APP) for each state Xcel Energy, Inc. serves. Currently, Xcel Energy, Inc. is finalizing the APP for Colorado and will begin work on other states. Standard reporting methods were also developed.

The primary methods Xcel Energy uses to address avian issues for transmission projects include:

- ◆ Working with the DNR to identify any areas that may require marking transmission line shield wires and/or to use alternate structures to reduce collisions; and,
- ◆ Attempting to avoid areas known as major flyways or migratory resting spots.

In their letter dated August 7, 2003, the DNR suggested using swan flight diverters (SFD) near WMAs, lakes, rivers, and wetlands. Xcel Energy has had success in reducing collisions on transmission lines by marking the shield wires with SFDs. SFDs are preformed spiral shaped devices made of polyvinyl chloride that are wrapped around the shield wire (Figure 17). Xcel Energy will work with the DNR to determine which areas should be marked when the line is constructed. Xcel Energy may also consider using H-frame structures in this area which puts the wires in parallel, making them easier for birds to see. This is the only significant avian issue identified for the 345 kV route. Typical water and soil conservation practices implemented by Xcel Energy will also contribute to protecting other organisms known to inhabit this region (Please see mitigation measures described above for water quality).

**FIGURE 17**  
**SWAN FLIGHT DIVERTER**



#### 4.4.7 RARE AND UNIQUE NATURAL RESOURCES

The USFWS and the Minnesota DNR were contacted to identify state and federally listed threatened and endangered species within the project area. Their response is attached as Appendix I.1-I.2. Table 16 lists rare or unique resources identified within one mile of the Project area. These resources were identified using the DNR Natural Heritage Database that was purchased for the Project.

**TABLE 16**  
**RARE AND UNIQUE RESOURCES**

Common Name	Scientific Name	Number of Occurrences	Federal Status <sup>1</sup>	MN Status <sup>2</sup>	State Rank <sup>3</sup>
Sullivant's Milkweed	<i>Asclepias sullivantii</i>	2		THR	S2
Hair-like Beak-Rush	<i>Phynchospora capillacea</i>	1		THR	S2
Small White Lady's Slipper	<i>Cypripedium candidum</i>	1		SPC	S3
Mesic Prairie		5			
Calcareous Fen		1			
Topeka Shiner	<i>Notropis topeka</i>	7	LE	SPC	S3
Plains Topminnow	<i>Fundulus sciadicus</i>	1		SPC	S3
Northern Cricket Frog	<i>Acris crepitans</i>	2		END	S1
Powesheik Skipper	<i>Oarisma powesheik</i>	1		SPC	S3

1. LE: Listed Endangered

2. END: Endangered; SPC: Special Concern

3. State Rank: A rank assigned to the natural community type, which reflects the known extent and condition of that community in Minnesota. Ranks range from 1 (in greatest need of conservation action in the state) to 5 (secure under present conditions)

Many of the rare and unique resources identified with the Project area are associated with remnants of prairie land, which were once abundant in this area of Minnesota. Approximately 99 percent of the prairie that was present in the State before settlement has been destroyed and one-third of Minnesota's endangered, threatened and special concern species are dependent on the fragments of prairie that remain. The Powesheik Skipper, in particular, inhabits native prairies, and has been recorded within a mile of the project area.

Topeka shiners and plains topminnows inhabit small clear streams are commonly found together, whereas the northern cricket frogs can be found any wet habitat suitable for breeding, primarily streams and wetlands with adjacent mudflats.

Calcareous Fens are rare wetland communities that are fed by seepage sites with an internal flow of groundwater rich in calcium and magnesium bicarbonates. Due to this specialized habitat, only calcium-tolerant plants can endure these specific growing conditions, facilitating a unique plant community at these sites. There is one identified fen within two miles of the Interstate Route. The Westside fen is located 0.5 miles north of the Route near Adrian in Nobles County.

#### **4.4.7.1 Impacts and Mitigation for Interstate Route – Rare and Unique Natural Resources**

No impacts to rare and unique natural resources are expected. The USFWS did not identify any rare or unique natural resources in the project area that would be impacted by the proposed project. The DNR identified records in the project area pertaining to Topeka Shiners, Northern Cricket Frog, and native prairie fragments. No impacts were anticipated if Xcel Energy attempts to avoid and minimize impacts to the resources they identified. Xcel Energy will verify that there are no native prairie remnants in areas where poles will be placed. Additionally, no poles will be placed within streams or other waterbodies, avoiding impacts to organisms that utilize these habitats. Near WMAs, practicable measures will be taken to ensure that avian mortality is minimized. A calcareous fen was identified within 0.5 miles of the site since the route will generally follow I-90, no impacts are anticipated to the fen site. Xcel Energy will work the Minnesota DNR to determine whether northern cricket frogs are present along the route and will focus efforts in the area that the last record occurs.

Xcel Energy will attempt to span any habitats where aquatic organisms and native prairie fragments have been recorded or could inhabit. All other rare and unique resources will be avoided to the greatest extent practicable. As described in Section 4.4.6.5, Xcel Energy will maintain sound water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent water resources and minimize soil erosion. The DNR had suggested that any disturbed soil near prairie areas be revegetated with prairie species native to Minnesota. Xcel will work with the DNR to comply with this request where appropriate.

#### **4.4.8 UNAVOIDABLE ADVERSE IMPACTS**

The unavoidable impacts caused by the construction of the Interstate Route are minimal. However, impacts that are unavoidable include noise, air, aesthetics, and agricultural impacts (Table 17).

**TABLE 17**  
**IMPACTS AND MITIGATION – INTERSTATE ROUTE**

Resource	Impact	Mitigation
<b>Noise</b>	Temporary impact from construction activities on the land surrounding the poles and the access road used for construction; Minor permanent impact from substation noise	Line routing was done to avoid areas with dense populations. The route will avoid homes to the greatest extent possible. Construction will be conducted consistent with local ordinances.
<b>Land Use</b>	Temporary impact from construction activities on the land surrounding the poles and the access road used for construction; Minor permanent impact from placement of poles	Routes were identified that avoided areas with dense populations. The route will avoid homes and use existing linear corridors to the greatest extent possible. Additionally, individuals with the route on their land will be compensated through easement dollars.
<b>Agriculture</b>	Temporary impact from construction activities to crop cycle and physical impact to the land along the access road and around the poles; Minor permanent impact from placement of poles	Permanent impacts were also minimized by using single pole structures, which only creates one obstruction for the landowners to farm around.
<b>Aesthetics</b>	There are no areas with significant visual importance that will be impacted by the transmission line. However, minor visual impact will occur in areas where poles will be placed.	The poles have been designed to be less visually intrusive on the landscape compared to the lattice structures used in the past. Also, line routing was done to avoid areas with a large number of homes and to use existing linear corridors that are already disturbed.
<b>Recreation</b>	Visual impacts will occur to recreational areas near the proposed transmission line.	The use of existing disturbed corridors and avoiding direct impacts to these areas, particularly WMAs was done when considering routing options for the transmission line.
<b>Air</b>	Temporary impacts will occur in the areas where Xcel Energy is actively constructing the transmission line.	Best management practices will occur during construction to minimize the amount of fugitive dust that is created.
<b>Water</b>	One wetland may be impacted by the proposed route, and would result in a permanent impact of 60 ft <sup>2</sup> . Temporary impacts will occur during construction.	All wetlands will be spanned if possible. If the wetland along T9 cannot be avoided Xcel Energy will minimize impacts as described in Section 4.4.6.5.
<b>Fauna</b>	The possibility of birds colliding with the lines is possible, especially in areas of high use by waterfowl during migration.	Xcel Energy will work with the DNR to identify areas along the new transmission line where additional measures are needed to protect the wildlife that may be impacted. Typical measures may include swan flight diverters and the use of H-frame structures

## 4.5 ROUTE 2 – ALLIANT ROUTE

### 4.5.1 ROUTE DESCRIPTION

The Alliant Route is identified on the detailed route maps in Appendix B and on an overview map in Figure 18. If this route is selected, Xcel Energy requests that the EQB approve an 85.7-mile route be approved that has a 660-foot width from the centerline of the designated route, to allow for reasonable flexibility in locating the transmission line. This would give Xcel Energy

reasonable flexibility in locating the transmission line. This 660-foot width has been identified on the segments in Appendices B.4 to B.26.

The South Dakota portion of the route is included in the application, but has not been finalized. The route described here may change prior to filing the South Dakota application, based on additional input from meetings with landowners and agencies. In addition, the route in South Dakota largely depends on which Route the Minnesota EQB approves.

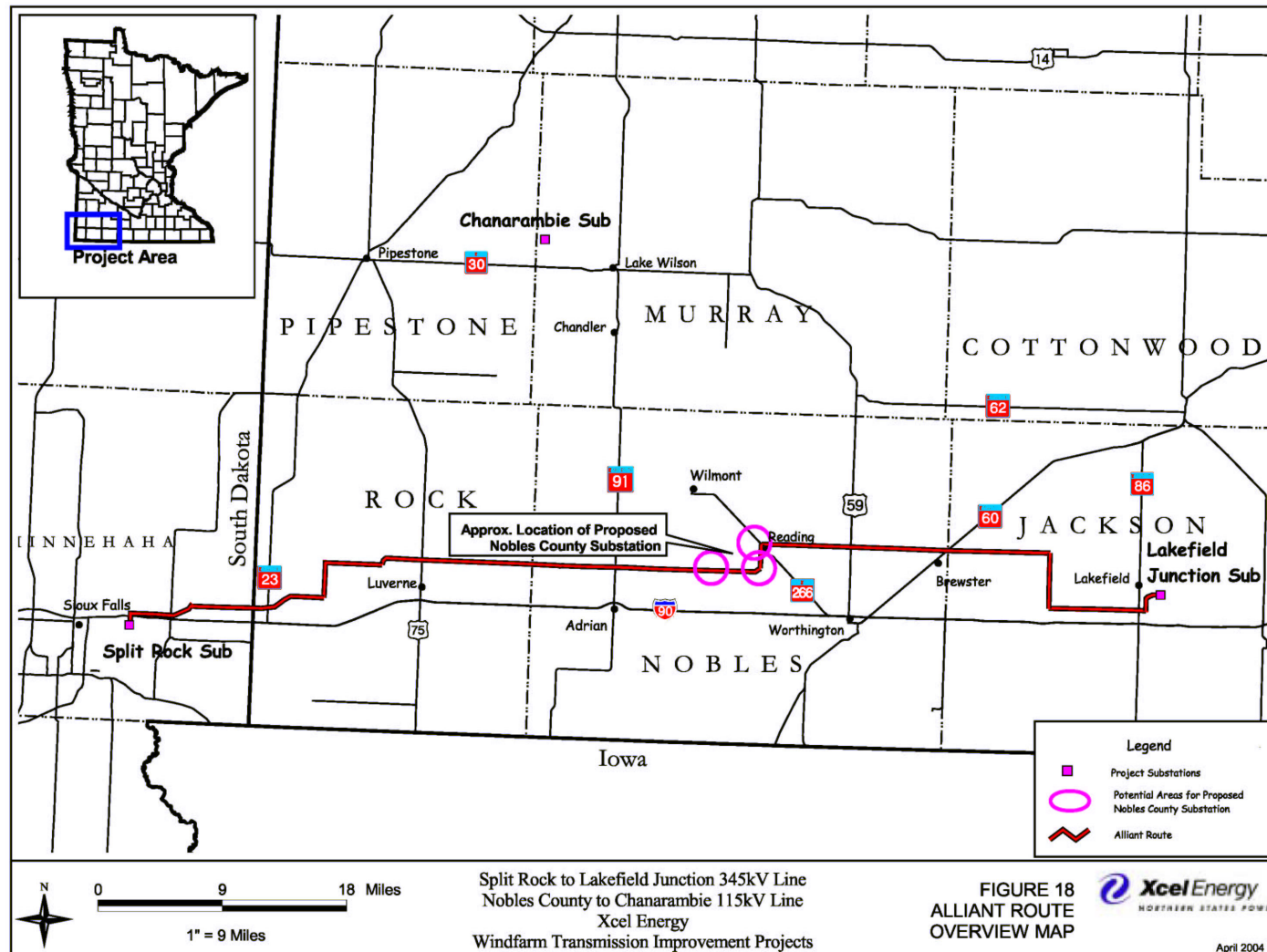
The Alliant Route is an 85.7-mile transmission line that will use single steel pole structures that would double circuit with the existing transmission line. Approximately 10.1 miles of the route is in South Dakota; the remaining 75.6 miles is in Minnesota and is the portion of the Alliant Route that is being considered for this application. It has been broken up into the following segments: T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14 and MF1. The route will be the same no matter which substation site is chosen. Below is a description of the Alliant Route by segment, starting on the western edge of the route:

**T1** begins at the Split Rock Substation in South Dakota. The line exits the substation north, crossing the Big Sioux River and I-90, where it joins the existing 115 kV transmission line, which is approximately 1000 feet north of the interstate. This segment will double circuit with the 115 kV transmission line for approximately 3,500 feet. At this point the line will convert to single circuit structures for the remainder of the segment. This segment is approximately 2.7 miles long and ends 1600 feet west of Highway 11 just south of Corson, SD near the railroad tracks.

**T2** begins at the railroad tracks west of Highway 11. It continues east double circuiting with the existing 161 kV transmission line, where it crosses Highway 11 and Split Rock Creek. Once crossing Split Rock Creek, the line turns northeast following the existing line through agricultural fields. The line ends approximately 2.5 miles east of 486<sup>th</sup> Street, where the 345 kV line goes north to the White Substation. The segment is approximately two miles in length.

**T3** follows the half section line north of 260<sup>th</sup> Street. The segment is approximately 4.5 miles long and double circuits with the existing 161 kV line through agricultural fields to the South Dakota/Minnesota border.

**FIGURE 18  
ALLIANT ROUTE OVERVIEW MAP**



**T4** begins at the state border. The line will continue to double circuit in a northeasterly direction, crossing T.H. 23. Approximately 2000 feet west of County Road 59, the line heads due east and ends at CSAH 6.

**T5** deviates north from the existing 161 kV transmission line, since it currently follows a streambed northeast to 131<sup>st</sup> Street. Instead of following the current route, Xcel Energy proposes to double circuit north along CSAH 6 for approximately 2.5 miles on the east side of the county highway ROW. The line will avoid the Rock County Reservoir and associated facilities on the east side of the road. At 131<sup>st</sup> Street, the line will continue as a double circuit line east for 4.1 miles until it reaches the existing 161 kV route, just past CSAH 11/100<sup>th</sup> Avenue.

**T6** will begin just past CSAH 11, where the existing 161 kV transmission line crosses 131<sup>st</sup> Street. At this point, the 345 kV transmission line will continue to double circuit along the existing route, northeast for approximately 3000 feet, where it heads east through farm fields along the half section line north of 131<sup>st</sup> Street. One mile after crossing 110<sup>th</sup> Avenue, the segment will end where the existing 115 kV transmission line crosses the existing 161 kV transmission line.

**T7** begins where the existing 115 kV line crosses the existing 161 kV line northwest of Luverne. The line crosses through farm fields, Rock River, and Elk Creek, approximately 0.5 miles south of Blue Mounds State Park for nine miles, until it reaches the Rock and Nobles County Border. Once in Nobles County, the line continues east through farm fields crossing several farmed drainages and streams for thirteen miles. Near Jones Avenue, the line will reach the site for Substation C.

**T8** begins 2700 feet west of Jones Avenue and the proposed site for Substation C. Regardless of whether this substation site is chosen, the line will double circuit along T8, crossing agricultural land for approximately four miles. This segment ends at the site for Substation B.

**T9** begins at the Substation B location along the half section west of CSAH 9. This segment of the route is 1.7 miles long and crosses CSAH 14, near Reading, Minnesota one mile north of the Substation B site. The line continues north, crossing an old railroad bed and T.H. 266. Northeast of Reading, near T.H. 266 is the location of Substation A.

**T10** follows the existing 161 kV ROW north of Reading. The line currently crosses agricultural land along the half section south of 190<sup>th</sup> Street. The line is approximately 2.9 miles north of

Worthington and follows the Alliant Route for 10.5 miles. Along T10, the line will cross Judicial Ditch 8, Elk Creek, and three unnamed tributaries of Elk Creek. This segment ends at Town Avenue.

**T11** continues double circuiting with the 161 kV line for three miles, where it crosses T.H. 60, just north of Brewster, Minnesota. At the Nobles and Jackson County border in Brewster, the line will abut a newly constructed substation and soybean processing facility. Once in Jackson County, the line will continue double circuiting for 7.5 miles, crossing Okabena Creek, ending 0.5 miles west of 390<sup>th</sup> Avenue.

**T12** begins where the existing 161 kV line heads north to Heron Lake, 0.5 miles west of 390<sup>th</sup> Avenue. The line will turn south and will single circuit along the half section line for four miles. The line will cross agricultural fields and Judicial Ditch 3, a farmed drainage north of 820<sup>th</sup> Street. The line will end 0.5 miles north of CSAH 12/800<sup>th</sup> Street.

**T13** directs the line east, single circuiting along the half section north of CSAH 12/800<sup>th</sup> Street. The line crosses a large wetland designated as a WPA west of 400<sup>th</sup> Avenue. The line will end 0.5 miles west of 42X<sup>th</sup> Avenue.

**T14** will double circuit with the 161 kV transmission line that comes from Wisdom and heads east 0.5 miles north of CSAH 12. The line crosses agricultural fields, County Road 7, Country Road 67, and T.H. 86. As the line crosses T.H. 86, it runs adjacent to local Lakefield businesses. This segment ends approximately 0.5 miles east of T.H. 86.

**MF1** is the segment that the Alliant Route will enter the Lakefield Junction Substation. A landowner in the area suggested this segment. It begins at the half section east of T.H. 86, and continues north through an agricultural field for 4600 feet, which is just south of 9<sup>th</sup> Avenue South. At this point the turns northeast, crossing 9<sup>th</sup> Avenue South and 460<sup>th</sup> Avenue. Approximately 900 feet north of the intersection of 9<sup>th</sup> Avenue and 460<sup>th</sup> Avenue, the line heads due east toward the Lakefield Junction Substation.

#### 4.5.2 DESCRIPTION OF ENVIRONMENTAL SETTING

Please see Section 4.4.2 for the general description of the environmental setting along the Alliant Route.

The topography along the Alliant Route is relatively level to sloping land ranging in elevation between 1413 and 1743 feet AMSL. Based on where the existing 161 kV transmission line

follows, the majority of the Alliant Route would cross cropland that is primarily used to grow corn and soybeans.

The communities and landscape are similar to that described in Section 4.4.2.

#### **4.5.3 HUMAN SETTLEMENT**

##### **4.5.3.1 Public Health and Safety**

The measures described in Section 4.4.3.1 are applicable to the Alliant Route.

##### **4.5.3.2 Commercial, Industrial, Residential Land Use**

Appendix F contains the zoning information applicable to the Alliant Route. The primary land uses along the Alliant Route are Agricultural. In Rock County, the 345 kV transmission line will also cross or abut shoreland areas, “Limited Ag Districts” and areas “Under Orderly Annexation Agreements” (see Section 4.4.3.2 and Appendix F). In Nobles County the transmission line only crosses areas that are zoned agriculture. Along the route in Jackson County, the line crosses areas zoned “Agricultural Preservation.” The line runs adjacent to areas zoned “General Industry”, “General Business”, and “Urban/Rural Residential” near Lakefield.

Businesses near the Alliant Route include the Nobles County Landfill, which is located southwest of Reading and a truck repair business. Additionally, there is a new Soybean processing facility in Brewster, with a Biodiesel facility planned in the near future. These facilities are immediately adjacent to the existing line and are in an area zoned “Industrial” by the City of Brewster.

##### **4.5.3.3 Displacement**

There are two homes that are within the proposed Xcel Energy ROW along the Alliant Route. There are eight additional homes within 300 feet of the transmission line, which are farther than 100 feet away. Please see Section 4.4.3.3 for information regarding landowner options in relation to 345 kV transmission lines.

##### **4.5.3.4 Noise**

Please see Section 4.4.3.4 for a background on noise and the Minnesota regulations regarding noise. The nearest residence to the transmission line is 60 feet away.

##### **4.5.3.5 Aesthetics**

The proposed structures for the 345 kV transmission line along the Alliant Route will be primarily double circuit 345/161 kV single steel pole structures spaced approximately 950 feet apart. Fewer poles may be utilized since the existing H-frames are approximately 600 to 750

foot spans and the Alliant Route will follow a more linear route. The new structures will replace the current 161 kV H-frame structures along this route. Figure 19 is a photograph of the existing H-frame structures. The new structures will be between 120 and 140 feet in height with a ROW of 150 feet. Much of the line will run along the existing 161 kV transmission line corridors. Approximately eleven miles of new ROW will be required that does not follow existing corridors. An additional 6.7 miles of the route will follow a county/township road that does not currently have transmission lines paralleling it.

The proposed line will be visible to farms and homesteads along the existing 161 kV routes, in addition to residents of Reading, Brewster, Okabena, and Lakefield and visitors to Blue Mounds State Park. The visibility of the line will vary with the line most visible in Brewster, but will appear as distant structures to the residents of Okabena.

**FIGURE 19**  
**PICTURE OF EXISTING 161 KV**



#### 4.5.3.6 Socioeconomic

There are six communities along the Alliant Route: Luverne, Reading, Worthington, Brewster, Okabena, and Lakefield. A summary of county and community population and economic characteristics, based on the 2000 U.S. Census, is in Table 18.

**TABLE 18**  
**POPULATION AND ECONOMIC CHARACTERISTICS**

Location	Population	Per Capita Income	Percent of Population below Poverty Level
<b>Rock County</b>	<b>9,721</b>	<b>\$17,411</b>	<b>8.0%</b>
Luverne	4,617	\$18,692	5.7%
<b>Nobles County</b>	<b>20,832</b>	<b>\$16,987</b>	<b>11.7%</b>
Brewster	502	\$16,263	6.5%
Reading <sup>1</sup>	–	–	–
Worthington	11,283	\$18,078	9.1%
<b>Jackson County</b>	<b>11,268</b>	<b>\$17,499</b>	<b>8.6%</b>
Lakefield	1,721	\$16,003	5.5%
Okabena	185	\$14,332	0.0%

1. No Census data was available for Reading, Minnesota

Please see Section 4.4.3.6 for a discussion of race and the leading industries in Rock, Nobles, and Jackson Counties.

#### 4.5.3.7 Cultural Values

Please see Section 4.4.3.7 for a discussion of Cultural Values along the Alliant Route.

#### 4.5.3.8 Recreation

Please see Section 4.4.3.8 for a general description of Recreation resources in the region.

Blue Mounds State Park is located in Rock County, and provides camping, picnicking, fishing, hiking trails, rock climbing, and wildlife watching. A paved bike trail extends from Luverne to Blue Mound State Park along County Road 18. The City of Luverne provides many facilities for additional recreational activities such as archery and hunting at the Rock County Sportsmen Club, as well as several City parks and sports fields. Hunting opportunities in Rock County are available at the Rock River WMA.

There are WMAs in Rock, Nobles and Jackson Counties along the Alliant Route, which are described in Section 4.4.3.8. The transmission line for the Alliant Route currently crosses the Rock River WMA. Maps identifying the WMAs and WPAs along the route are in Appendix B. Table 19 identifies the distance of these WMAs to the Alliant Route.

**TABLE 19**  
**WMAs ALONG THE ALLIANT ROUTE**

County	WMA	Distance to Route (miles)	Size (Acres)
Rock	Rock River	0 <i>crossed by line</i>	420.8
Nobles	Bluebird Prairie	0.5	77.5
	Herlien-Boote	2.0	561.0
Jackson	Summers	1.0	164.8

In Jackson County, there is one WMA and two WPAs. Summers WMA provides hunting, wildlife watching and hiking opportunities. Ninneman and Ulbricht WPAs are Federally managed wetlands and surrounding uplands open to hunting and wildlife watching. These lands are purchased and managed by the U.S. Fish and Wildlife Service to provide high quality wetlands and nesting cover for waterfowl and other species of wildlife. The transmission line will cross the Ninneman WPA approximately 5.5 miles west of the City of Lakefield. A map identifying WMAs and WPAs along the route is attached in Appendix B.4 to B.26.

#### **4.5.3.9 Public Services**

The public services discussed in 4.2.3.9 are applicable to the Alliant Route. In addition, the Nobles County Landfill is located just south of the Alliant Route north of Rushmore east of the Substation C location. The Rock County Rural Water District owns a reservoir along County Road 6, north of Beaver Creek. The reservoir holds 50,000 gallons of water and is contained underground at the building location. There is a six-inch watermain on the east side of County Road 6, with two-inch feeder lines running east and west from the reservoir. All water lines are buried six feet deep.

#### **4.5.3.10 Impacts and Mitigation for Alliant Route – Human Settlement**

##### **Commercial, Industrial, Residential Land Use**

All land uses crossed by the Interstate route have the potential to be impacted by the proposed route. Land Use impacts were determined using the LMIC International Coalition Land Use/Land Cover project information. Along the Alliant Route, approximately 0.53 acres of

agricultural land and 0.04 acres of grassland will be impacted permanently due to the construction of the transmission line (Appendix E). Temporary construction impacts to all land uses will be approximately 203 acres, and is described in more detail in Appendix E.

Impacts to Land Uses were minimized by using single, steel poles, which will minimize impacts to agriculture, the primary land use along the route. The utilization of existing linear corridors also helps to minimize impacts to land uses along the route.

### **Noise**

Please see Section 4.4.3.10 for a discussion on the impacts and mitigative measures regarding noise in the region.

### **Aesthetics**

The aesthetics in the area will be similar to the existing visual character of the area. There may be fewer poles used compared to the existing H-frame structures, and the footprint along the route for the poles will be less than the existing structures. The new poles will be taller, making them visible for a longer distance across the landscape, however, this will not be significantly different than the existing viewscape. Approximately 71 percent of the Alliant route will share existing corridors along the route, the majority of which is with the existing 161 kV transmission line. Xcel Energy has not identified any aesthetic resources that would be impacted by this transmission line.

Although the line will be a contrast to surrounding land uses, Xcel Energy has identified routes that utilize existing corridors and avoid homes to the greatest extent practicable. Xcel Energy will work with landowners to identify concerns related to the transmission line and aesthetics.

### **Socioeconomics**

Please see Section 4.4.3.10 for a general discussion on the impacts and mitigative measures regarding socioeconomics in the region. A delay in the in-service date as discussed in Section 2.6 would cause a negative impact on the region. If the proposed 345 kV transmission line is not constructed in a timely manner the wind generators already constructed on the ridge and those proposed in the near future, would not have the infrastructure available to outlet the wind energy being generated.

### **Recreation**

The line will likely be visible to individuals using recreational resources within two miles of the transmission line. The Alliant Route will also cross the Rock River WMA along the same

corridor as the current 161 kV line. There are currently H-frame structures within the WMA boundaries. The existing H-frame structures will be removed and replaced with the new single steel pole structures. A maximum of two poles will be required to be placed on WMA property. The maximum permanent impact to this WMA would be 120 ft<sup>2</sup> for the pole foundations. The poles will be taller, but will be single steel poles instead of the wooden H-frame structures currently on site. The Alliant Route will also cross a WPA along segment T13.

Xcel Energy will attempt to span the WPA and WMA to avoid direct impacts to the property. However, if it is not possible to span these properties, the Company will work with the USFWS and the MN DNR to identify ways to minimize impacts to waterfowl and other organisms that may utilize the area near the new transmission line.

### **Public Services**

There are no impacts anticipated to the landfill. Traffic may increase in the area slightly during construction, but not to a point that landfill operations will be affected. The transmission line will be constructed to avoid impacts to the pipelines associated with the public water supply located adjacent to the Alliant Route and to any additional public utilities along the route.

No mitigative measures are anticipated for the landfill operations or any additional public services not mentioned below. In regards to the Rock County Rural Water District's reservoir located adjacent to the Alliant Route, Xcel Energy will work closely with the Rock County Rural Water District to assure that all pipelines are identified so impacts to the rural water system and its accessory utilities, such as underground electrical lines, can be avoided.

## **4.5.4 LAND-BASED ECONOMIES**

### **4.5.4.1 Agriculture**

The description of the County agricultural resources in Section 4.4.4.1 is applicable to the Alliant Route. If the line is double circuited the existing Alliant Route H-frame structures will be replaced with single steel pole structures, decreasing the area that cannot be farmed by the landowner. Currently, the H-frame structures that are along the Alliant Route have a footprint of approximately sixteen feet. The new 345 kV structures will be eight feet in diameter, which is half of the current footprint occupied by the H-frame structures.

### **4.5.4.2 Forestry**

Please see Section 4.4.4.2 for a description of forestry resources near the Project.

#### 4.5.4.3 Tourism

Much of the tourism in Rock County is primarily in Luverne, Minnesota. Please see Section 4.4.4.3 for a discussion of tourist attractions in Lakefield and Luverne, Minnesota.

The 1,826-acre Blue Mound State Park, north of Luverne, annually sees over 80,000 visitors, and is a popular attraction in the area. In Rock, Nobles, and Jackson Counties, much of the tourism is focused on the recreational opportunities in the region. In addition, the growing prevalence of the wind farms in this region of Minnesota has increased interest in alternative energy and this new resource that Minnesota is producing. The existing 161 kV transmission line is visible from the park.

#### 4.5.4.4 Mining

For a description of the geological resources in the area, please see Section 4.4.4.4. According to MN/DOT county pit maps for Jackson, Noble, and Rock Counties, one active and one inactive gravel pit are located within a mile of the Alliant Route corridor. The active pit lies approximately one mile south of the corridor in Beaver Creek Township and the inactive pit is located north of Luverne. Two commercial aggregate pits are also located in close proximity to the proposed route. Both aggregate pits lie south of the proposed transmission line near Luverne.

#### 4.5.4.5 Impacts and Mitigation for Alliant Route – Land-Based Economies

##### Agriculture

Permanent impacts will occur to farmland throughout the corridor. However, these impacts will be minimal and will occur primarily due to pole placement. During construction, temporary impacts such as soil compaction and crop damages within the ROW are likely to occur. Approximately 186 acres of agricultural land will be impacted temporarily by the proposed Project. Permanent impacts to agricultural lands are estimated at 0.53 acres for the Alliant Route. Also, the footprint of the new transmission line will be less than the existing H-frame, which has a two-pole base at each location, where the new structures will be single poles. Appendix E describes the land use impacts for the route in more detail.

Wherever possible, poles will be placed so that they closely follow the I-90 ROW fence line, minimizing permanent impacts to agricultural land. The company will utilize existing 161 kV ROW when practicable. When possible, Xcel Energy will attempt to construct the transmission line before crops are planted or following harvest. However, the Company will be on a tight timeline to complete this project by 2007, so it cannot be guaranteed. The Company will compensate landowners for crop damage and soil compaction that occurs as a result of the

Project. Soil compaction will be addressed by compensating the farmer to repair the ground or by using contractors to come in and chisel plow the site. Normally, a declining scale of payments was set up over 3 years.

#### **4.5.5     ARCHAEOLOGICAL AND HISTORIC RESOURCES**

Please see Section 4.4.5 for a brief regional prehistoric and historic-period context.

##### **4.5.5.1   Impacts and Mitigation for Alliant Route – Archaeological and Historic Resources**

A search of the Minnesota State Historic Preservation Office (SHPO) database identified 47 historic architectural sites and 18 archaeological sites within one mile of the proposed route. None of these sites are in the Project corridor. Therefore, no impacts are anticipated to previously recorded cultural resources.

Xcel Energy sent a letter to the SHPO requesting a review of the proposed project for compliance with the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act. The SHPO responded that an archaeological survey of the project was not needed. A copy of the response letter is attached in Appendix I.8.

No impacts to previously identified cultural resources are anticipated. Archaeological probability along the Alliant Route appears relatively low and no impacts are expected; therefore, no mitigation is needed. Xcel Energy will provide the contractor with construction guidelines in relation to cultural resources. If crews discover anything that may be of cultural significance, proper procedures in protecting that resource will be outlined for the contractor.

#### **4.5.6     NATURAL ENVIRONMENT**

##### **4.5.6.1   Air Quality**

Please see Section 4.4.6.1 for a discussion of Air Quality along the Alliant Route.

##### **4.5.6.2   Water Quality**

The Alliant Route passes through the Big Sioux, Rock River, Little Sioux, West Fork Des Moines, and East Fork Des Moines major surface water watersheds. Individual stream and ditch crossings are listed in Table 20. The third column of the table indicates whether the body of water crossed is identified as a public water on the Public Waters Inventory Maps.

**TABLE 20**  
**WATER CROSSINGS FOR ALLIANT ROUTE**

Segment	Waterbody Name	Public Water
T4	Unnamed Tributaries to Springwater Creek (7)	--
T4	Springwater Creek (2)	X
T4	Unnamed Intermittent Stream	--
T4	Unnamed Tributaries to Beaver Creek (6)	--
T4, T5	Unnamed Tributaries to Beaver Creek (3)	X
T5	Beaver Creek	X
T5, T6	Little Beaver Creek (2)	X
T6	Unnamed Tributaries to Little Beaver Creek (2)	--
T7	Unnamed Tributaries to Rock River (3)	--
T7	Unnamed Intermittent Stream	--
T7	Rock River	X
T7	Unnamed Tributary to Rock River	X
T7	Unnamed Tributaries to Elk Creek (7)	--
T7	Unnamed Tributary to Elk Creek	X
T7	Elk Creek	X
T7	Unnamed Tributaries to Kanaranzi Creek (6)	--
T7	Kanaranzi Creek	X
T7	Unnamed Intermittent Stream	--
T7	Unnamed Tributary to Kanaranzi Creek	X
T7, T8	Unnamed Tributaries to East Branch Kanaranzi Creek (3)	--
T7	Unnamed Tributary to East Branch Kanaranzi Creek	X
T8	Judicial Ditch 11B	X
T8	Unnamed Tributary to Judicial Ditch 11B (2)	--
T8, T9	County Ditch No. 5 (3)	--
T10	Judicial Ditch No. 8	X
T10	Judicial Ditch No. 8	--
T10	Elk Creek	X
T10	Unnamed Tributary to Elk Creek	--
T10	Unnamed Tributaries to Elk Creek (2)	X
T11	Unnamed Tributary to Okabena Creek	--
T11	Okabena Creek	X
T12	Judicial Ditch No. 22	X
T13	Little Sioux River	X
T14, MF1	Unnamed Tributary to Judicial Ditch No. 3 (3)	--

(#) – Number of crossings. May indicate multiple crossings of the same stream or several streams with the same description.

Approximately 50 wetlands were identified on the NWI maps along the Alliant Route that will be spanned by the transmission line.

Please see Appendix B.4 to B.26 for maps identifying the PWI and NWI resources along the Alliant Route.

Table 21 summarizes the MPCA “2002 MN 305(b) Report to Congress of the United States” as it pertains to the water quality of the water bodies crossed by the proposed line.

**TABLE 21**  
**SURFACE WATER QUALITY ASSESSMENT FOR THE ALLIANT ROUTE**

Water Body	Aquatic Life	Swimming
Rock River	Not Supported	Partially Supported
Little Sioux River	Fully Supported	Not Assessed
Okabena Creek	Not Attainable	Not Attainable
Elk Creek	Not Assessed	Not Assessed

Based on MPCA 2002 MN 305(b) Report to Congress of the United States

#### 4.5.6.3 Flora

A majority of the vegetation surrounding the Alliant Route is agricultural land. This land was once a part of the prairie grassland region of Minnesota, and areas along the proposed corridor may contain prairie remnants. Where the transmission line crosses the Rock River WMA, the land is mapped by the DNR as cultivated land within the borders.

Please see Section 4.4.6.3 for a description of the plants that historically occur in the area and may be present in prairie remnants in the region.

#### 4.5.6.4 Fauna

Please see Appendix H for a description of the typical fauna found in this region of Minnesota. Near Luverne, the line will cross the Rock River WMA and the Rock River. This area is likely to contain habitats for many of the common organisms found in this region of Minnesota. The line will also cross a WPA west of Lakefield. This area is west of 400<sup>th</sup> Avenue, north of County Road 12. These areas are managed to support waterfowl and other wildlife.

Blue Mound State Park is located just north of Luverne. The park is home to wildlife such as bison, coyote, and deer. The combination of lakes and grassland provide habitat for many types of sparrows and birds rarely found in Minnesota.

#### **4.5.6.5 Impacts and Mitigation for Alliant Route – Natural Environment**

##### **Air Quality**

See Section 4.4.6.5 for a description of air quality impacts and mitigation.

##### **Water Quality**

Xcel Energy will attempt to span all the wetlands along the route. It is possible that the wetlands crossed by Segments T9 and T13, may not be able to be spanned, and Xcel Energy is looking at options to cross these water resources. If T9 cannot be spanned due to the width of the wetland it is anticipated that no more than one structure would need to be placed in the wetland. If the 1600 ft wide wetland along T13 cannot be spanned, a maximum of two structures will be needed to be placed in the wetland.

See Section 4.4.6.5 for a description of water and soil conservation practices applicable to the Alliant Route.

##### **Fauna**

Please see Section 4.4.6.5 for a description of impacts and mitigation.

#### **4.5.7 RARE AND UNIQUE NATURAL RESOURCES**

Blue Mound State Park is approximately four miles north of Luverne, MN and one mile north of the Alliant Route and the existing 161 kV H-frame transmission line. This park is home to a small herd of buffalo and contains a fragment of tallgrass prairie that is being actively managed to promote restoration of the native grasses and wildflowers. It is one of the only location in Minnesota where prickly pear cactus can be found growing. The area encompassed by the park also has a rich history. The large rock outcrop of Sioux quartzite provided residents of Luverne with quartz for many of the buildings including the County Courthouse.

The USFWS and the Minnesota DNR were contacted to identify state and federally listed threatened and endangered species within the project area. Their response is attached as Appendix I.1-I.2 and I.9. Table 22 lists the rare or unique resources identified within one mile of the Project area. These resources were identified using the DNR Natural Heritage Database that was purchased for the Project.

Many of the rare and unique resources identified within the Project area are associated with remnants of prairie land, which were once abundant in this area of Minnesota. Approximately 99 percent of the prairie that was present in the State before settlement has been destroyed and one-third of Minnesota's endangered, threatened and special concern species are dependent on the fragments of prairie that remain. The regal fritillary and lined snake, in particular, inhabit native prairies, and has been recorded within a mile of the project area.

Topeka shiners and plains topminnows inhabit small clear streams and are commonly found together. The short-eared owl is migratory and primarily inhabits areas with open grasslands and fields. Their primary food source is small mammals. All these habitats occur along the Alliant Route.

**TABLE 22**  
**RARE AND UNIQUE RESOURCES**

Common Name	Scientific Name	Number of Occurrences	Federal Status <sup>1</sup>	MN Status <sup>2</sup>	State Rank <sup>3</sup>
Sullivant's Milkweed	<i>Asclepias sullivantii</i>	1		THR	S2
Blackfoot Quillwort	<i>Isoetes melanopoda</i>	1		END	S1
Mudwort	<i>Limosella aquatica</i>	1		SPC	S3
Slender Plantain	<i>Plantago elongata</i>	1		THR	S2
Tumblegrass	<i>Schedonnardus paniculatus</i>	1		SPC	S3
Wester Prairie Fringed Orchid	<i>Platanthera praeclara</i>	1	LT	END	S1
Mesic Prairie		3			
Topeka Shiner	<i>Notropis topeka</i>	7	LE	SPC	S3
Plains Topminnow	<i>Fundulus sciadicus</i>	1		SPC	S3
Lined Snake	<i>Tropidoclonion lineatum</i>	2		SPC	S3
Regal Fritillary	<i>Speyeria idalia</i>	3	LE	SPC	S3
Short-Eared Owl	<i>Asio flammeus</i>	1		SPC	S3

1. LE: Listed Endangered; LT: Listed Threatened

2. THR: Threatened; END: Endangered; SPC: Special Concern

3. State Rank: A rank assigned to the natural community type, which reflects the known extent and condition of that community in Minnesota. Ranks range from 1 (in greatest need of conservation action in the state) to 5 (secure under present conditions)

#### **4.5.7.1 Impacts and Mitigation for Alliant Route – Rare and Unique Natural Resources**

No impacts to rare and unique natural resources are expected. The USFWS did not identify any rare or unique natural resources in the project area that would be impacted by the proposed project. The DNR identified records in the project area pertaining to Topeka Shiners and native prairie fragments. By utilizing mitigative measures, Xcel Energy will be able to eliminate the risk of impacts on these resources. A survey of the route will be made prior to route construction and efforts will be made to avoid placing poles in areas with native prairie remnants. Near WMAs and WPAs, practicable measures will be taken to ensure that risk for avian mortality is minimized. Additionally, Xcel Energy will not place poles within streams or other waterbodies, largely avoiding impacts to organisms that utilize these habitats.

Xcel Energy will attempt to span the habitats where aquatic organisms and native prairie fragments have been recorded or could inhabit. As described in Section 4.4.6.5, Xcel Energy will maintain sound water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent water resources and minimize soil erosion. The DNR had suggested that any disturbed soil near prairie areas be revegetated with prairie species native to Minnesota. Xcel Energy will work with the DNR to comply with their request where appropriate. The occurrence record for the short-eared owl is over 25 years old, and no recent record has been submitted to the DNR Natural Heritage Database, therefore Xcel Energy does not feel that mitigation is necessary for this specific species. General avian mitigative measures will be utilized to protect birds along the project route.

#### **4.5.8 UNAVOIDABLE ADVERSE IMPACTS**

The unavoidable impacts caused by the construction of the Alliant Route are minimal. Unavoidable impacts include: noise, air, aesthetics, and agricultural impacts (Table 23).

**TABLE 23**  
**IMPACTS AND MITIGATION – ALLIANT ROUTE**

Resource	Impact	Mitigation
Noise	Temporary impact from construction activities	Line routing was done to avoid areas with dense populations. The route will avoid homes to the greatest extent possible. Construction will be conducted consistent with local ordinances.
Land Use	Temporary impact from construction activities on the land surrounding the poles and the access road used for construction. Approximately 15 acres of land will be permanently impacted by the construction of the substation.	The line will be sited to avoid areas with dense populations. Line routing was done to avoid areas with a large number of homes. The route will avoid homes and use existing linear corridors to the greatest extent possible.
Agriculture	Temporary impact from construction activities to crop cycle and physical impact to the land along the access road and around the poles; Minor permanent impact from placement of poles	Impacts are minimized by using single pole structures, which only creates one obstruction for the landowners to farm around.
Aesthetics	There are no areas with significant visual importance that will be impacted by the transmission line. However, minor visual impact will occur in areas where poles will be placed.	The poles have been designed to be less visually intrusive on the landscape compared to the lattice structures used in the past. Also, line routing was done to avoid areas with a large number of homes and to use existing linear corridors that are already disturbed.
Recreation	Visual impacts will occur to recreational areas near the proposed transmission line.	The use of existing disturbed corridors and avoiding direct impacts to these areas, particularly WMAs was done when considering routing options for the transmission line.
Air	Temporary impacts will occur in the areas where Xcel Energy is actively constructing the transmission line.	Best management practices will occur during construction to minimize the amount of fugitive dust that is created.
Water	Two wetlands may be impacted by the proposed route, and would result in a permanent impact of 180 ft <sup>2</sup> , for the worst case scenario. Temporary impacts will occur during construction.	All wetlands will be spanned if possible. If the wetlands along T9 and T13 cannot be avoided Xcel Energy will minimize impacts as described in Section 4.4.6.5.
Fauna	The possibility of birds colliding with the lines is possible, especially in areas of high use by waterfowl during migration.	Xcel Energy will work with the DNR to identify areas along the new transmission line where additional measures are needed to protect the wildlife that may be impacted. Typical measures may include swan flight diverters and the use of H-frame structures.

#### 4.6 PREFERRED ROUTE

In determining whether to issue a permit for a high voltage transmission line, the EQB considers 14 factors, which are listed in Minnesota Rule 4400.3150. A discussion of each of the relevant factors for the Interstate Route and the Alliant Route are provided side by side in Table 24 below.

The deciding factors in selection of the Interstate Route as the preferred route are as follows:

- ◆ The Interstate Route uses less new right-of-way. The Interstate Route uses existing corridors for all but approximately 3 miles of the 88-mile route. In contrast, the Alliant Route relies upon new right-of-way for approximately 11 miles of its 86-mile route.
- ◆ The Interstate Route will have less impact on wetlands than the Alliant Route. The Interstate Route is expected to traverse Section T9 and may require the installation of one new pole in this wetland area. In contrast, the Alliant Route will traverse to wetland areas T9 and T13 and may require the installation of new poles in both of those wetlands.
- ◆ The Interstate Route will have lesser impacts on recreational areas. The Alliant Route will cross the Rock River WMA, which the Interstate Route avoids.
- ◆ The Interstate Route is less costly than the Alliant Route by approximately \$8.5 million.
- ◆ The Interstate Route will have less agricultural impact. The Interstate Route will cause 0.39 acres in permanent impacts compared to the Alliant line's permanent impact of 0.53 acres. Similarly, the Interstate Route will cause 136 acres of temporary construction impacts compared to the Alliant temporary construction impacts of 186 acres.
- ◆ Construction time for the Interstate Route will be less than the time to construct the Alliant Route. The Project is scheduled to be complete by 2007. The Interstate Route was chosen to assure that the schedule could be met. The Alliant Route will take at least eight and as many as seventeen months longer to build than the Interstate Route, delaying the in-service date of the project (and the 825 MW wind outlet plan) until May 2008 or January 2009. There are two reasons for the longer construction time:
  - 1) The 161 kV line cannot be removed from service between May 15 and October 15, effectively reducing the construction year from twelve to seven months. From May to September air conditioning use increases loading on the transmission grid. As a result, major components like the existing 161 kV transmission line cannot be removed from service for the long periods necessary to rebuild the line. Additionally, from September to October grain drying causes a similar high-load scenario in this part of the state.

2) Removal of the existing 161 kV line will also increase the amount of time it takes to construction within the existing corridor.

- ◆ Double circuiting transmission lines may decrease the reliability of the system. This is because one structure supports two lines, and if a pole goes down in an outage, both lines are taken out of service, increasing the number of customers affected. Double circuiting along the Alliant Route would also require significant coordination with Alliant Energy for outages. Finally, an outage to this line may impact customers of at least two different utilities requiring additional coordination during restoration.

**TABLE 24**  
**FACTORS CONSIDERED FOR THE**  
**SPLIT ROCK TO LAKEFIELD JUNCTION 345 KV ROUTE**

Factor	Interstate (to Substation A)	Alliant (to Substation A)	Lesser Impacts
<b>Effects on human settlement and aesthetics</b>			
<b>Displacement</b>	None	None	----
<b>Noise</b>	Noise levels will be within state standards and below background levels.	Same	----
<b>Aesthetics</b>	Poles and line will affect viewscape. However, 91 percent of the route follows existing disturbed corridors. Placement of the line will potentially cause visual impacts to 5 homes along the route.	Poles and line will affect viewscape. However, 71 percent of the route follows existing disturbed corridors. Placement of the line will potentially cause visual impacts to 10 homes along the route.	Interstate
<b>Cultural Values</b>	None	None	----
<b>Recreation</b>	There would be minimal visual impact to the WMAs and local parks in the area. No direct impacts to recreational areas anticipated. (For potential impact to WMAs, see Effects on Human Settlement Section 4.5.3.10.)	There would be direct impact to the WMA at Rock River as a result of replacing existing H-frame structures with single pole structures. A maximum of two poles will be required to be placed on WMA property resulting in 120 ft <sup>2</sup> of permanent impacts.	Interstate
<b>Public Services</b>	None	None	----
<b>Socioeconomic</b>	Minor positive short-term effects from construction activities to local economy expected.	Minor positive short-term effects from construction activities to local economy expected.	----
<b>Effects on public health and safety</b>	None	None	
<b>Effects on land-based economies</b>	Pole placement will impact farmland throughout the corridor. Temporary impacts, including soil compaction and crop damages are also likely. Temporary impacts expected to affect 136 acres of agricultural land. Permanent impact area estimated at 0.49 acres.	Pole placement will impact farmland throughout the county. Temporary impacts, including soil compaction and crop damages are likely. Temporary impacts expected to affect 186 acres of agricultural land. Permanent impact area estimated at 0.53 acres.	Interstate

Factor	Interstate (to Substation A)	Alliant (to Substation A)	Lesser Impacts
<b>Effects on archeological and historic resources</b>	No historical architectural or archaeological sites located within the Project corridor.	Same	----
<b>Effects on the natural environment</b>			
<b>Air</b>	There will be no measurable impacts relating to ozone. Temporary air quality impacts will be caused by construction-related emissions.	Same	----
<b>Water</b>	Temporary impacts to wetlands may occur if necessary for crossing. Permanent impacts to wetlands possible at Segment T9. Xcel Energy will attempt to span the wetland in this area, but may need to install one pole that would cause 60 ft <sup>2</sup> of permanent impacts.	Temporary impacts to wetlands may occur if necessary for crossing. Permanent impacts to wetlands possible at Segment T9 and T13. Xcel Energy will attempt to span wetlands, but may need to install one pole in T9 area wetland that would cause 60 ft <sup>2</sup> of permanent impacts and two poles in T13 wetland which would cause 120 ft <sup>2</sup> of permanent impacts.	Interstate
<b>Flora/fauna</b>	Nominal impacts are expected to flora given that the majority of the route follows an already altered landscape. Impacts to fauna possible (line collision).	Same	----
<b>Effects on rare and unique natural resources</b>	None anticipated.	None anticipated	----
<b>Application of design options that maximize energy efficiencies, mitigate adverse environmental effects and could accommodate expansion of transmission capacity</b>	Xcel Energy will work with the affected landowners to use a design that mitigates the impact on the affected landowners and the ROW. Future expansion designs not included for this project, but expansion potential exists. However, there are no known or likely plans to add additional transmission capacity along the proposed route. Therefore, the design is appropriate to this Project and maximizes energy efficiency.	Xcel Energy will work with the affected landowners to use a design that mitigates the impact on the affected landowners and the ROW. However, there are no known or likely plans to add additional transmission capacity along the proposed route. Therefore, the design is appropriate to this project and maximizes energy efficiency. Additionally, expansion is not possible because new line would double circuit with existing line.	----

Factor	Interstate (to Substation A)	Alliant (to Substation A)	Lesser Impacts
Use or paralleling of existing rights-of-way, survey lines, natural division lines and agricultural field boundaries	Route designed to follow existing rights-of-way, survey lines, and agricultural field boundaries. Refinements will be made during construction with input from landowners.	Same	----
Use of existing large electric power generating plant site	Not applicable.	Not applicable.	----
Use of existing transportation, pipeline and electrical transmission systems or rights-of-way	Route will follow highway, transmission line and county township roads. Route would utilize existing corridor for 91% of the route, or all but approximately three miles.	Route will follow highway, transmission line and county township roads. Route would utilize existing corridor for 71% of the route, or all but approximately 11 miles.	Interstate
Electrical System Reliability	Line and route designed to provide reliable outlet capability to Buffalo Ridge.	Same. However, the line would be double circuited for 79 percent of the route and a double circuit is less reliable than a single circuit line.	----
Costs of constructing, operating and maintaining the facility which are dependent on design and route	Construction costs estimated to \$49,710,000. O&M costs estimated at \$1,000/mile.	Construction costs estimated to be \$58,230,000. O&M costs estimated at \$1,000/mile.	Interstate
Adverse human and natural environmental effects which cannot be avoided	The unavoidable impacts to human and natural environment are minimal. Construction related activities would cause short-term impacts, mainly in the form of disturbed soils. Long-term, the installation of poles and conductors along the proposed route will create aesthetic impacts that cannot be avoided.	Same	----
Irreversible and irretrievable commitments of resources	The proposed route does not require any irreversible or irretrievable commitment of resources. If the line were removed in the future, the land could be restored to its prior condition and put to a different use.	Same	----

## **5.0 ENVIRONMENTAL INFORMATION: NOBLES COUNTY SUBSTATION**

### **5.1 DESCRIPTION OF NOBLES COUNTY SUBSTATION SITES**

There are three substation sites under consideration for the Project. Substation A is located north of Reading in Section 23, Township 103, Range 41, between 190<sup>th</sup> and 198<sup>th</sup> Streets, and is the preferred substation site. Substation B is located in Section 35, Township 103, Range 41, a minimum maintenance road is on the northern edge of the site with 220<sup>th</sup> Street to the South. Substation C is located in Section 31 and 32, Township 103, Range 41, adjacent to County Road 61. Each site will require fifteen acres of land to be developed for the substation structures. Xcel Energy will acquire a minimum of forty acres and are willing to purchase larger pieces of land to facilitate constructing a buffer area around the substation. Buffer areas typically provide distance between the substation and adjacent property, but can also include plantings and berms when appropriate and feasible.

Substation A is the preferred site area because of the amount of land available to develop and the close proximity of the site to a major thoroughfare, T.H. 266 which can support transportation of trucks and heavy equipment to and from the site. The site also allows easy access to future development that may occur in the region. This site is less than 0.5 mile north from the town of Reading.

Substation B is located southwest of Reading and west of T.H. 266. There is currently a minimum maintenance road that would be used to access the site, but would have to be upgraded to permit travel and construction to and from this site. The cost to upgrade the road is estimated between \$1.3 and \$2.6 million. A final estimate will need to be done after consulting with the township. County Roads are also near the site and can be used for access or future transmission lines to the site.

Substation C is an acceptable location because of its the proximity of the substation to Buffalo Ridge. However, there are several homes and archaeological resources close to the proposed site, making it less desirable to construct on this location. In addition, the creek to the south also restricts flexibility in siting the substation in this area.

### **5.2 DISCUSSION OF SUBSTATION SITE ALTERNATIVES**

In siting the substation, Xcel Energy needed to consider the locations of both the 345 kV and 115 kV transmission lines. The CON approved for the project identified Nobles County as the

location for the substation site connecting both of these lines. When the Company evaluated the potential development in the area and the trend of wind development in the area along the ridge, it was determined that the 115 kV line should follow Buffalo Ridge to accommodate the probable wind farm development in the area. Due to the numerous environmental resources (i.e., WMAs) in the area, there was a narrow corridor where the 115 kV line could be routed without impacting those resources, and consequently, few feasible locations for the Nobles County Substation where the 345 kV and 115 kV lines would interconnect.

### **5.3 DESCRIPTION OF ENVIRONMENTAL SETTING**

Please see Section 4.4.2 for a description of the environmental setting in this region of Minnesota. All three sites are located in an agricultural setting. The sites are primarily flat to gently rolling terrain. The site for Substation A is approximately 1710 feet AMSL, whereas Substation B is approximately 1680 feet AMSL. The Substation C site is at approximately 1650 feet AMSL. There are several small, farmed drainages in the vicinity of each site, and an unnamed stream bisects the area of Substation C. Several homesteads are present throughout the landscape.

### **5.4 HUMAN SETTLEMENT**

#### **5.4.1 PUBLIC HEALTH AND SAFETY**

The primary issue associated with human health and safety for substations is restricting public access to the substation. Xcel Energy will fence all the equipment within the substation. Proper signage will be posted warning the public of the risk of coming into contact with the energized equipment.

Another issue that is raised with substations is public concern with EMF exposure. EMF levels at substations drop off rapidly from the fenced area. At 100 feet away from a substation fence, the EMF levels from the substation equipment are at background levels. Any measured fields in that area and beyond would be from distribution lines and transmission lines entering and exiting the substation. See Section 3.5 for a discussion on EMF.

#### **5.4.2 COMMERCIAL, INDUSTRIAL, RESIDENTIAL LAND USE**

Nobles County has zoned the area that Substation A encompasses as “Rural Residential” (R-2) in Reading and “Agricultural” in the remaining area. Substations B and C are within areas of the county that are zoned “Agriculture”. There are a few businesses within two miles of each site. Near Substation A, a Co-operative, Reading Bus Lines, and a taxidermy business are within 0.5 miles of the proposed site. Substations B and C are located near the Nobles County Landfill,

which is located at the corner of Knauf Avenue and 220<sup>th</sup> Street. A woodworking business is also located one mile from the proposed Substation C site location.

Xcel Energy recently learned of a couple that is looking to build a new home on a 20 acre piece of land within the location for Substation C and adjacent to the Alliant Route on Jones Road. The house will be an acceptable distance away from the route proposal. That parcel would not be considered for a substation site if that area was determined as the place to locate the substation.

#### **5.4.3 DISPLACEMENT**

There are no homes that will be displaced as a result of the construction of the substation. Once one of the three sites is chosen, Xcel Energy will work with the landowner to site the substation in the most desirable location. Currently there are 15 homes within the Substation A site location (not including the homes in Reading), 11 homes within the Substation B site location, and 12 homes within the Substation C site location.

#### **5.4.4 NOISE**

Please see Section 4.4.3.4 for a background on noise and the Minnesota regulations regarding noise.

#### **5.4.5 AESTHETICS**

Figure 20 represents a typical substation of the size that will be used at the Nobles County Substation. The substation will be visible from Reading or surrounding homesteads, depending on the site chosen. Substation A would be visible to travelers along T.H. 266 and to residences in and around Reading. Access to the site would likely be direct from T.H. 266. Future transmission lines would likely reach the site along existing corridors from the northwest or southeast along T.H. 266 or via CSAH 9, east of the site. Substation B would be less visibly intrusive to residents of Reading, because well-established windbreaks shield most of these homes from the view of Substation B. Access to Substation B could be accomplished by upgrading the minimum maintenance roads off of T.H. 266 or using County Road 9. No upgrades would be required if access was along well maintained roadways. Existing corridors available to access the site include County Road 9, 220<sup>th</sup> Street, County Road 14, and County Road 61. The location of Substation C is restricted by the number of homes in the vicinity and the creek to the south. Access to the site would likely be via County Road 14 or 220<sup>th</sup> Street, from T.H. 266, which is approximately six miles to the east. Future transmission lines that would follow existing corridors would likely be routed along County Road 61 or County Road 34 to access the site.

**FIGURE 20**  
**PICTURE OF A TYPICAL 345 KV SUBSTATION**



#### 5.4.6 SOCIOECONOMIC

The substation sites are located in Nobles County in Summit Lake Township near Reading. A summary of the Nobles County, Reading and Summit Lake Township population and economic characteristics, based on the 2000 U.S. Census, is in Table 25.

**TABLE 25**  
**POPULATION AND ECONOMIC CHARACTERISTICS**

Location	Population	Per Capita Income	Percent of Population below Poverty Level
Nobles County	20,832	\$16,987	11.7%
Reading <sup>1</sup>	–	–	–
Summit Lake Township	375	\$13,955	6.9%

1. No Census data was available for Reading, Minnesota

The substation sites do not contain populations of disproportionately high minority populations or low-income populations.

In Nobles County as a whole, there has been a shift from agriculture to other industries such as manufacturing. However, in Summit Lake Township the leading industry continues to be agriculture. Table 26 identifies the leading industries in each county within the project corridor:

**TABLE 26**  
**LEADING COUNTY INDUSTRIES**

Geographic Area	Industry	Percent of Workforce
<b>Nobles</b>	Manufacturing	21.3
	Educational, health and social services	18.6
	Retail Trade	13.2
<b>Summit Lake Township</b>	Agriculture, forestry, fishing and hunting, and mining	27.8
	Educational, health and social services	26.3
	Retail Trade	10.2

#### 5.4.7 CULTURAL VALUES

Cultural values include those perceived community beliefs or attitudes in a given area, which provides a framework for each social group's unity. The communities along the project corridor value their pioneer roots and the history surrounding their settlement.

The village of Reading and residents of Summit Lake Township are within close proximity of the proposed substations. The economy of these areas depends mostly on agricultural (livestock, poultry, dairy and grain) and manufacturing (fertilizer, motor vehicle parts, feeds and concrete) opportunities. Attractions include regional and county outdoor recreational facilities for camping and hiking.

#### 5.4.8 RECREATION

No recreational resources are present near the potential site locations for Substations A, B, and C.

#### 5.4.9 PUBLIC SERVICES

Please see Section 4.4.3.9 for typical public services in the region.

#### 5.4.10 IMPACTS AND MITIGATION NOBLES COUNTY SUBSTATION – HUMAN SETTLEMENT

##### Commercial, Industrial, Residential Land Use

Land use will change from agriculture to a land use category typically referred to as an “essential service.” This land use category is a conditional use of agricultural land in Nobles County.

The transmission line and substation could potentially support a shift in the region's land use from primarily agricultural farming to also include wind farming. The wind farming would not preclude traditional agricultural farming from continuing. Only land for the turbines and access roads are taken out of production. Once the wind turbines are constructed, all land surrounding the turbines can still be farmed.

The substation will be sited and designed to avoid residences in the area. If the EQB selects a site near residences, Xcel Energy will look at options to screen the substation to minimize aesthetic impacts.

### **Noise**

HDR Engineering, on behalf of Xcel Energy, conducted noise monitoring at the existing Chanarambie Substation and proposed Substations A, B, and C on February 25, 2004. Noise monitoring was conducted in accordance with MPCA Rule 7030.0060. Readings were taken with Quest Technologies Model 2900 and Larson Davis Model 820 Integrating/Logging Sound Level Meters. Temperatures ranged from approximately 26° to 30° F. Winds were out of the south approximately 12-15 mph. All measuring events lasted one hour.

MPCA State Noise Standards exist for both Daytime (7:00 am – 10:00 pm) and Nighttime (10:00 pm – 7:00 am). Therefore, measurements were taken from 3:30 – 6:30 pm and from 10:00 pm – 1:00 am at each of the monitoring locations. The location near the Chanarambie Substation was chosen approximately 50 feet from the substation, halfway between the substation and the roadway. The location for proposed Substation A was chosen in a field, approximately 200 feet off of Hwy 266. The location for proposed Substation B was chosen in a field, just off of 110<sup>th</sup> Street (no traffic on this street). The location for proposed Substation C was chosen in a field, approximately 50 feet off of County Road 61 (little traffic on this road).

Results are given in Table 27 and compared to MPCA Standards. See Appendix C.1 for the monitoring locations.

**TABLE 27**  
**COMPARISON OF MONITORING RESULTS WITH MPCA STANDARDS**

Substation	NAC	Duration Of Event	Temp °F Day / Night	Monitored Day		Mn Day		Monitored Night		MN Night	
				L10 (dBA)	L50 (dBA)	L10 Std.* dBA)	L50 Std.* (dBA)	L10 (dBA)	L50 (dBA)	L10 Std.* (dBA)	L50 Std.* (dBA)
Chanarambie	1	60 min.	28/26	48	46	65	60	48	45	55	50
Proposed "A"	1	60 min.	28/27	53	48	65	60	52	48	55	50
Proposed "B"	1	60 min.	28/28	60	50	65	60	54	48	55	50
Proposed "C"	1	60 min.	30/28	52	44	65	60	51	43	55	50

The only background noise audible at each of the monitoring locations was the wind. Monitoring results demonstrate that existing noise levels are in compliance with MPCA Standards.

The nearest noise receptor to the Chanarambie Substation is approximately 2,160 feet east. The nearest receptor to Proposed Substation A is approximately 1,330 feet northwest or east. The nearest receptor to Proposed Substation B is approximately 650 feet northwest. The nearest receptor to Proposed Substation C is approximately 330 feet east. It is unlikely that there will be any noise impacts associated with these substations at the nearest noise receptors in these locations. Please see Section 4.4.3.10 for mitigation regarding noise.

All of the proposed substation sites were identified to limit the number of homes in close range, primarily to minimize noise impacts. Xcel Energy's final location and plan will site the substation on the property to maximize the distance from homes in the area.

### Aesthetics

The proposed substation will be most visible to landowners immediately adjacent to the parcel of land that would be developed. The substation will also be visible to motorists driving along roads adjacent to the facility. The town of Reading is less than one mile from Proposed Substation A. The substation will be visible from town. It will not however, be a dominant feature. Substations B and C will have limited local visibility because the substation will be sited away from high traffic areas.

Impacts to area aesthetics will be minimized by locating the substation in an appropriate location. Additionally, the area around the substation may be screened with plants or berms to minimize visual impacts.

### **Socioeconomic**

Socioeconomic impacts will be minor and will be offset by the positive economic impacts as described in Section 4.4.3.10. As described in Section 4.4.3.10, Table 28 outlines the temporary construction jobs which will be created in the area..

**TABLE 28  
ESTIMATED NUMBERS OF WORKERS FOR  
CONSTRUCTION OF THE 345 KV TRANSMISSION LINE**

Type of Work	Number of Employees
Land Rights	1
Survey	2-3
Construction-Grading and Foundations	4-5
Construction-Fencing	3
Construction-Electrical	5-6
Commission and Testing	4

These jobs are primarily for current Xcel Energy employees. The grading and foundation work is commonly contracted to local businesses.

Impacts to the local township will be incurred due to the permanent loss of 15 acres of agricultural land. Agriculture in Summit Lake Township accounts for 27.8 percent of the workforce, and is the leading industry.

### **Cultural Values**

The construction of the substation will help to create the infrastructure necessary to support additional wind development in the project vicinity. As wind development has become more widespread in this region, area residents have begun to embrace the concept of "farming" the wind and are beginning to view wind as a new "crop." Other communities in Southwest Minnesota have begun to embrace the importance of alternative energy sources and publicize how their community has contributed to this developing technology. Residents in the area have begun to build a strong sense of identity and community as keepers of an important Minnesota resource.

**Public Services**

If the substation is constructed along a minimum maintenance road, traffic accessing the site may have difficulty during winter months, making access difficult, and increases in traffic on these roads may degrade them even further.

Xcel Energy will upgrade any minimum maintenance road that would be traveled on a regular basis for maintenance and operations.

**5.5 LAND-BASED ECONOMIES****5.5.1 AGRICULTURE**

See Section 4.4.4.1 for a general description of the agricultural environment in Nobles County. At the time of field investigations land surrounding the substation sites were planted in corn.

**5.5.2 FORESTRY**

Please see Section 4.4.4.2 for a description of forestry resources.

**5.5.3 TOURISM**

Please see Section 4.4.4.3 for a discussion of general tourist activities in Nobles County. No tourist attractions were identified within one mile of each of the substation sites.

**5.5.4 MINING**

Please see Section 4.4.4.4 for a description of geological resources in the region.

According to the MN/DOT county pit maps for Nobles County, no active/inactive gravel pits or rock quarries were identified within a mile of any of the three proposed substations. The closest mining consists of a small cluster of active/inactive gravel pits located between 2 and 3 miles southwest of the Substations A and B and 2 miles southeast of Substation C.

**5.5.5 IMPACTS AND MITIGATION FOR NOBLES COUNTY SUBSTATION – LAND-BASED ECONOMICS****Agriculture**

Permanent agricultural impacts will be 15 acres for the construction of the substation and auxiliary structures. The substation will require 40 acres of land and the remaining land will be a buffer between the substation and existing land uses. To the extent possible, Xcel Energy will

locate the substation property along agricultural division lines. During construction, temporary impacts such as soil compaction and crop damages are likely to occur within the ROW.

Xcel Energy will work with landowners to site the substation in the most appropriate location for all the parties involved. A substation site development plan will be completed prior to construction. Efforts will be made to minimize impacts to soil and crops where feasible. Xcel Energy will compensate landowners for crop damage and soil compaction that occurs as a result of Project construction. Soil compaction will be addressed by compensating the farmer to repair the ground or by using contractors to come in and chisel plow the site. Normally, a declining scale of payments was set up over three years.

### **Tourism**

Construction of the Project may have a positive impact on tourism in the county. Construction of the facilities will allow additional wind generators to be installed in the area. The existing turbines have attracted tourists and additional development should increase the number of people visiting the county to view first-hand this growing industry. Heritage Museum and Wind Power Learning Center of SW Minnesota is near Lake Benton and recently opened to the public. It features information on wind power with interactive workstations. By supporting additional development of wind energy, the counties along the route will further establish themselves as a unique tourist attraction in the State of Minnesota.

## **5.6 ARCHAEOLOGICAL AND HISTORIC RESOURCES**

Please see Section 4.4.5 for a brief regional prehistoric and historic-period context.

### **5.6.1 IMPACTS AND MITIGATION FOR NOBLES COUNTY SUBSTATION – ARCHAEOLOGICAL AND HISTORICAL RESOURCES**

A search of the Minnesota State Historic Preservation Office (SHPO) database identified no historic architectural sites and no archaeological sites within one mile of proposed sites for Substations A and B and no historic architectural sites and five archaeological sites within one mile of proposed site for Substation C. None of these sites are in the project area. Therefore, no impacts are anticipated to previously recorded cultural resources.

Xcel Energy sent a letter to the SHPO requesting a review of the proposed project for compliance with the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act. The SHPO responded that an archaeological survey of the project was not needed. A copy of the response letter is attached in Appendix I.8.

No impacts to previously identified cultural resources are anticipated. Although no archaeological survey was conducted at the site, archaeological probability at proposed Substation C appears moderate considering the relative density of known archaeological resources in the vicinity. If the site of Substation C is selected for construction, the substation footprint and impact area would be surveyed for archaeological resources to assist in project siting. Any identified archaeological resources would be evaluated for National Register of Historic Places eligibility in consultation with the Minnesota SHPO and EQB.

## **5.7 NATURAL ENVIRONMENT**

### **5.7.1 AIR QUALITY**

Currently, both state and federal governments have regulations regarding permissible concentrations of ozone and oxides of nitrogen. The national standard is 0.08 ppm on an eight-hour averaging period. The state standard is 0.08 ppm based upon the fourth-highest eight-hour daily maximum average in one year. The substation as designed will generate less corona and less ozone than the transmission lines due to the use of larger conductors which results in a lower conductor surface gradient and less ozone generation than the transmission line.

### **5.7.2 WATER QUALITY**

The water bodies within a one-mile radius of the possible substation locations, A through C, were identified using the USGS 7.5 minute topographic map of the area. Substation A has no water bodies within the site. Substation B is bisected by County Ditch No. 5 which drains to Judicial Ditch 11B which in turn drains to Kanaranzi Creek. An unnamed intermittent stream that drains to Kanaranzi Creek bisects the Substation C location. There are numerous wetlands identified at each of the substation sites. The NWI maps identify 18 small wetlands within Substation A, 19 wetlands within Substation B, and 15 wetlands within Substation C.

### **5.7.3 FLORA**

Flora in the immediate vicinity of the proposed substation sites is cultivated land. Much of the land that would be acquired is plowed and tilled, with little to no vegetation present, with the exception being along the field margins. Please see Section 4.4.6.3 for a description of vegetation historically in this area.

### **5.7.4 FAUNA**

Fauna that will be found in the area are those species typically associated with agricultural areas. A list of the organisms found in this region of Minnesota is included in Appendix H.

### 5.7.5 IMPACTS AND MITIGATION FOR NOBLES COUNTY SUBSTATION – NATURAL ENVIRONMENT

#### Air Quality

Please see Section 4.4.6.5 for impacts regarding air quality.

#### Water Quality

The substation will be designed to avoid impacts to wetlands and other water bodies near the substation sites. During construction there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading and construction traffic at the sites with existing water bodies. The substation will be sited and graded in such a manner to minimize impacts on local water bodies. Once the substation is completed, it will have a Storm Water Pollution Prevention Plan (SWPPP) in place to minimize impacts on surface water quality. Sound water and soil conservation practices during construction and operation of the Project will not only minimize impacts to surface water quality, but also minimize impacts to flora and fauna in the area. Xcel Energy will avoid individual wetlands and drainage systems during construction.

#### Fauna

Impacts to local fauna are possible, if animals are able to access the substation equipment. A fence will surround the exterior of all substation equipment, to help in deterring animals from entering the area. Birds are easily able to reach the equipment, and measures similar to Section 4.4.6.5 will be implemented to minimize impacts to these species.

### 5.8 RARE AND UNIQUE NATURAL RESOURCES

No Rare or Unique Natural Resources were identified within the vicinity of the proposed substation sites.

#### 5.8.1 IMPACTS AND MITIGATION NOBLES COUNTY SUBSTATION – RARE AND UNIQUE NATURAL RESOURCES

No impacts or mitigation are anticipated since no rare or unique natural resources have been identified in this area.

## 5.9 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable Adverse Impacts include (Table 29):

**TABLE 29**  
**IMPACTS AND MITIGATION – NOBLES COUNTY SUBSTATION**

Resource	Impact	Mitigation
Noise	Temporary impact from construction activities; Minor permanent impact from substation noise	Construction will be conducted consistent with local ordinances.
Land Use	Temporary impact from construction activities; Minor permanent impact from placement of poles	Substation sites were chosen to avoid areas with dense populations. Most of the impacts should occur on Xcel Energy property.
Agriculture	Assuming a 40 acre site, temporary impacts will be 25 acres due to the construction activities related to ground disturbance for staging and construction. Xcel Energy has estimated permanent impacts at 15 acres due to construction of the substation.	Xcel Energy intends to purchase 40 acres of land from a willing seller. Only 15 acres will contain substation equipment, whereas the remaining 25 acres may be available for lease to farm around the substation.
Aesthetics	Visual impacts are possible to landowners near the proposed substation location.	The substation will be constructed in an area that is an appropriate location for the substation. Additionally the substation site may include screening to minimize visual impacts.
Air	Temporary impacts will occur in the areas when Xcel Energy is actively constructing the substation.	Best management practices will be followed during construction to minimize the amount of fugitive dust that is created.
Fauna	Minimal impacts to fauna is expected.	A fence will surround the exterior of all substation equipment, to help in deterring animals from entering the area.

## 5.10 PREFERRED SITE

An EQB permit for a high voltage transmission line can also include associated facilities, including a substation. In this Application, the Company is asking the EQB to approve

construction of a 15-acre substation facility in one of three locations in fairly close proximity to each other. Although the EQB rules do not explicitly provide that the 14 factors in Minnesota Rule 4400.3150 apply to substations, the factors provide guidance to the EQB on whether to approve the request permit. The three alternatives are all-acceptable, and have substantially similar costs. They also have substantially similar environmental impacts and cannot be differentiated on that basis. For example, regardless of which site is chosen, permanent agricultural impacts will be 15 acres. Temporary impacts such as soil compaction and crop damage are also likely to occur. No significant impacts anticipated to air quality or water quality other than temporary minor impacts resulting from construction.

The key factors that separate the three alternatives are as follows:

- ◆ Substation B is less desirable because it would require upgrading existing minimum maintenance roads. This increases the cost to build the substation by approximately \$1.3 to \$2.6 for a road one-half mile to one mile long.
- ◆ Substation C is less desirable because it could impact archeological resources identified in the area. Additionally, it would cost an additional \$590,000 to use the route to Substation C.
- ◆ Substation A is preferred because existing roads can support the substation construction and the potential impacts associated with Substation C are avoided. Cost for building the 345 kV and 115 kV transmission lines is reduced due to the convenience of connecting the lines at this location.

## **6.0 ENVIRONMENTAL INFORMATION: NOBLES COUNTY SUBSTATION TO CHANARAMBIE SUBSTATION 115 KV LINE**

### **6.1 ROUTE SELECTION PROCESS – 115 kV LINE**

Please see Section 4.1 for an overview of how the route and route segments are selected. The considerations related to the 115 kV project routing were:

- 1) Use of Road ROW: The existing corridors along the proposed route for the 115 kV line and are primarily county and township roads. No other linear corridors were available and Xcel Energy wanted to minimize the amount of cross-country routes chosen.
- 2) Avoiding Significant Natural Features: To the west of the proposed routes there are two natural features to avoid: Buffalo Ridge, and the adjacent Chanarambie Valley. Additionally to the east of the proposed routes there are an abundance of state WMAs in the corridor between the proposed Nobles County Substation and the Chanarambie Substation.
- 3) Minimize Impacts to Siting Wind Projects: The general location of planned and/or existing Wind Farm projects was considered. Areas where wind turbines may be located were avoided. However, the line was located near this area to allow the projects to efficiently tie into the transmission system. This should minimize the need for additional transmission.

The table in Appendix E summarizes the impacts associated with the proposed route segments. This table identifies the ROW required, Land Use Impacts, Corridor Sharing, Residences, Businesses, and Environmental Resources that are along these route segments. Appendix E is a map identifying the location of each route segment.

### **6.2 DISCUSSION OF 115 kV ROUTE SEGMENT ALTERNATIVES NOT USED**

Several route segment alternatives have been provided in Appendix D for the 115 kV Route which were not used in Xcel Energy's proposed routes. These segments were not used for the proposed route because they did not meet the criteria outlined above in Section 6.1. A table identifying these segments and the resources that may be impacted are presented in Appendix E.

Similar to the 345 kV route, segments were dropped from consideration due to the close proximity to homes or sensitive environmental resources. As stated before, Xcel Energy is open to considering routes that follow segments that were not used in the proposed routes. However, the Company believes that the two route combinations proposed in this application minimize impacts to the greatest extent.

## **6.3 ROUTE W – WEST ROUTE**

### **6.3.1 ROUTE DESCRIPTION**

The West Route generally follows County and Township roads for the entire route and detailed route maps can be found in Appendix D and Figure 21. The route would be approximately 35.6 miles long if Substation C were chosen, versus approximately 36.2 miles if Substation A or B were chosen. The segments for the West Route from Substations A and B include EW1, W2, W3, W4, W5 and W6. Substation C uses AW1 instead of EW1 and W2 to exit the substation.

#### **6.3.1.1 West Route if Substation Sites A or B Selected**

**EW1** follows Trunk Highway 266 northwest along the northeast side of the highway for 3.6 miles to the junction of T.H. 266 and King Avenue. The line crosses agricultural land along this segment of the route.

**W2** begins at the junction of T.H. 266 and 170<sup>th</sup> Street a minimum maintenance road. The line will be routed along the north side of the road for two miles until it reaches Hesselroth Avenue.

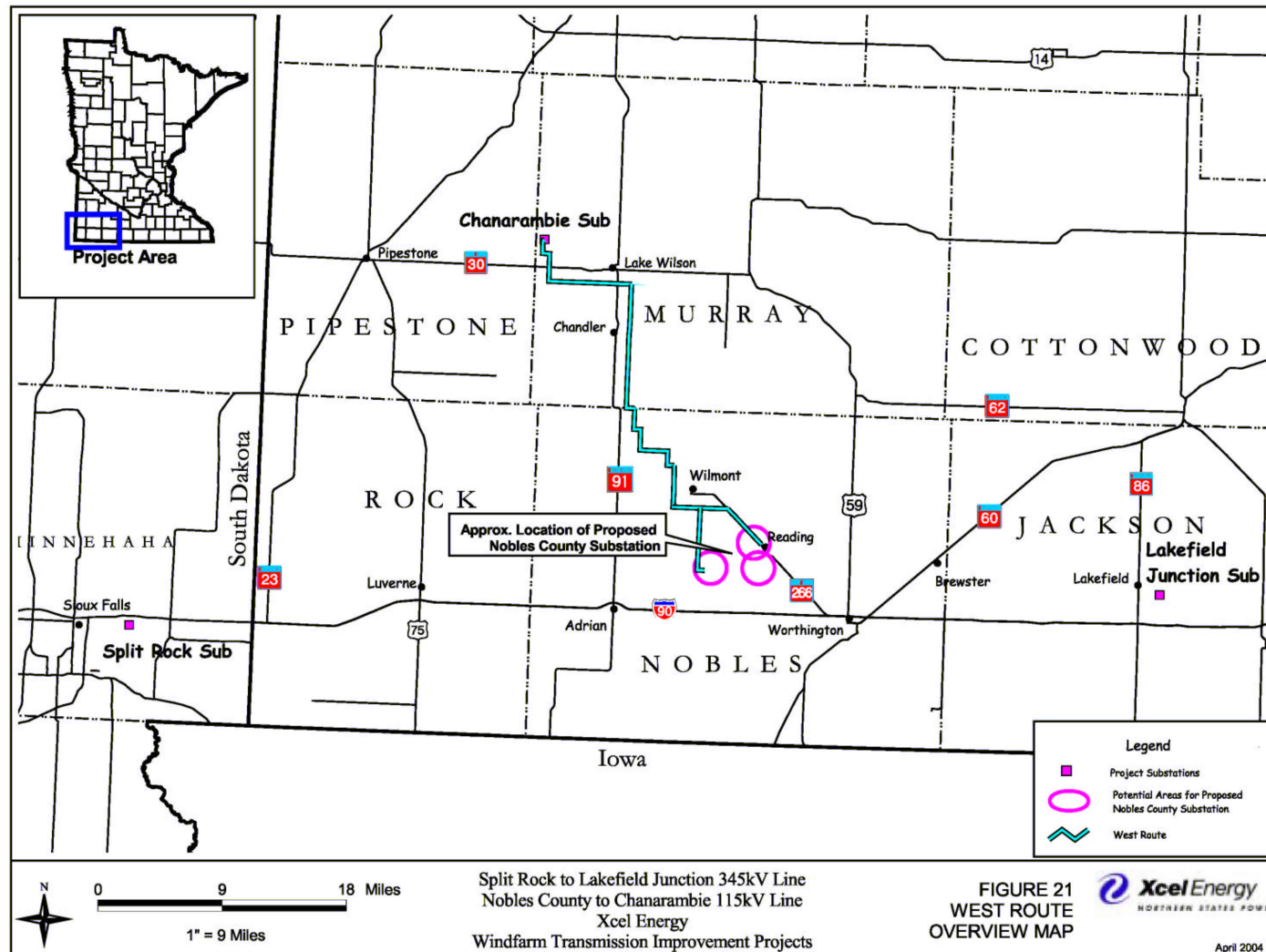
#### **6.3.1.2 West Route if Substation Site C Selected**

**AW1** follows Hesselroth Avenue north from Substation C for approximately 5.0 miles. The line will begin on the west side of Hesselroth Avenue and will shift to the east side of the road at CSAH 14 to avoid a home on the west side of the road. The road will continue north until it reaches 170<sup>th</sup> Street.

#### **6.3.1.3 Remainder of West Route**

**W3** begins at the junction of segments AW1 and W2 on 170<sup>th</sup> Street and will double circuit with a 69 kV line for two miles. The line continues west from the junction of these segments, along the north side of the road, passing the Alliant Energy Wilmont Substation at Fellows Avenue. At Erickson Avenue, the line will turn north, along the west side of the road. It will follow Erickson Avenue for three miles, ending at CSAH 18/140<sup>th</sup> Street.

**FIGURE 21  
WEST ROUTE OVERVIEW MAP**



**W4** will follow CSAH 18 as a single circuit line west for 0.5 miles toward St. Kilian. The line will continue to single circuit along new ROW as it turns north along the half section to 130<sup>th</sup> Street. At this point the line will turn west and follow 130<sup>th</sup> Street for approximately 2 miles, where it turns north along new ROW for 1.5 miles along the half section west of Durfee Avenue. The line then turns 0.5 miles west toward Dillman Avenue, where it follows Dillman Avenue north for 1.5 miles to County Road 71 at the Nobles and Murray County border.

**W5** follows County Road 71 west for approximately 0.5 miles to 70<sup>th</sup> Avenue. Along the west side of the road the line follows 70<sup>th</sup> Avenue for three miles, where it may double circuit with an existing 69 kV transmission line for the remainder of the segment. North of CSAH 4/156<sup>th</sup> Street, the line will cross to the east side of the road. This will distance the line from the Chandler WMA, which is located west of 70<sup>th</sup> Avenue. The segment will end at 91<sup>st</sup> Street, approximately one mile south of Lake Wilson.

**W6** begins at the junction of 70<sup>th</sup> Avenue and 91<sup>st</sup> Street along the south side of the road and will double circuit with the 69 kV transmission line. The line will continue to double circuit as it crosses to the north side of 91<sup>st</sup> Street at South Ridge Substation. At 50<sup>th</sup> Avenue, the line crosses to the south side of 91<sup>st</sup> Street. At CSAH 26/40<sup>th</sup> Avenue the land use changes slightly, since many of the agricultural fields in this area have wind turbines dotting the landscape. The line will turn north toward the Chanarambie Substation at 10<sup>th</sup> Avenue for two miles. The line will turn west at 111<sup>th</sup> Street for 0.5 miles. At the ½ section line, the segment will turn north entering the Chanarambie Substation. Due to the amount of wind development in this area, it has started to become congested in the area near Chanarambie Substation. Xcel Energy is asking the EQB for flexibility to reach the Chanarambie Substation from 91<sup>st</sup> Street and is asking for a corridor that extends between 20<sup>th</sup> Avenue and County Line Avenue. Additionally, Xcel Energy requests the option of relocating the 115 kV transmission lines near Chanarambie substation to accommodate the new transmission line.

### **6.3.2 DESCRIPTION OF ENVIRONMENTAL SETTING**

Please see Section 4.4.2 for a description of the environmental setting in this region of Minnesota and a description of the communities and landscape. The sites are primarily flat to rolling terrain ranging in elevation from 1630 to 1902 feet AMSL. This route extends into Murray County, which is slightly more rolling terrain than the counties to the south. With the development of wind energy on Buffalo Ridge, the landscape has become dotted with wind farms.

### **6.3.3 HUMAN SETTLEMENT**

#### **6.3.3.1 Public Health and Safety**

As with the 345 kV transmission line, proper safeguards will be implemented for construction and operation of the 115 kV transmission line. Please see Section 4.4.3.1 for typical safeguards implemented by Xcel Energy.

#### **6.3.3.2 Commercial, Industrial, Residential Land Use**

Land use along the West Route is primarily agricultural. In Nobles County, the line will run adjacent to areas zoned “Agricultural” throughout the route and Rural Residential (R-2) near the towns of Reading and St. Killian. In Murray County, the line will cross areas zoned “Agricultural” and “Conservation.” Conservation districts are intended to protect environmentally sensitive, scenic areas; retain major areas of natural ground cover for conservation purposes; and deter the abuse of water resources and conserve other natural resources of the county.

Due to the wind resources on Buffalo Ridge, the construction of the Chanarambie Substation and supporting infrastructure, wind farms in Murray County are becoming a common fixture in the landscape. Traditional farming practices around wind farms in Murray County have been increasing over the past five years.

#### **6.3.3.3 Displacement**

There are no homes that will be displaced as a result of the construction of the proposed line. There are approximately 25 homes within 300 feet of the West Route. None of these homes is closer than 100 feet of the transmission line. The nearest residence to the transmission line is 115 feet away.

#### **6.3.3.4 Noise**

Please see Section 4.4.3.4 for a background on Noise and the Minnesota regulations regarding noise. The nearest residence to the West Route is 115 feet from the proposed route centerline.

#### **6.3.3.5 Aesthetics**

The proposed structures for the 115 kV line from the new Nobles County Substation to the existing Chanarambie Substation will be a single pole construction similar to other 115 kV transmission lines in the area. The structures will be between 70 to 80 feet in height and will have a span of 400 feet between the poles. The right-of-way required for these types of structures is approximately 75 feet wide. The West Route follows existing county, township, and state roads.

The new transmission line likely will be visible to residents of Reading, Chandler, and Lake Wilson. There are many wind developments along the West Route, especially in Murray County.

#### 6.3.3.6 Socioeconomic

There are five communities within the project area, which include Reading, Wilmont, St. Killian, Chandler and Lake Wilson. A summary of county and community population and economic characteristics, based on the 2000 U.S. Census, is in Table 30.

**TABLE 30**  
**POPULATION AND ECONOMIC CHARACTERISTICS**

Location	Population	Per Capita Income	Percent of Population below Poverty Level
<b>Nobles County</b>	<b>20,832</b>	<b>\$16,987</b>	<b>11.7%</b>
Reading <sup>1</sup>	–	–	–
St. Killian	–	–	–
Wilmont	315	\$16,160	4.9%
<b>Murray County</b>	<b>9,165</b>	<b>\$17,936</b>	<b>8.3%</b>
Chandler	271	\$16,134	6.8%
Lake Wilson	276	\$16,573	13.3%

1. No Census data was available for Reading, Minnesota

According to the 2000 U.S. Census, approximately 98.3 percent of the population in Murray County is white, in Nobles County 86.5 percent of the population is white. Each community within the project area does not contain populations of disproportionately high minority populations or low-income populations.

Table 31 lists the leading industries in each county within the project corridor:

**TABLE 31**  
**LEADING COUNTY INDUSTRIES**

County	Industry	Percent of Workforce
Murray	Educational, health and social services	20.7
	Agriculture, forestry, fishing and hunting, and mining	15.2
	Manufacturing	11.7
Nobles	Manufacturing	21.3
	Educational, health and social services	18.6
	Retail Trade	13.2

In Nobles County, manufacturing has become an important industry in the region. However, these jobs are primarily located in the larger cities in the county. In the townships along the transmission line, agriculture is the primary industry in most instances.

#### **6.3.3.7 Cultural Values**

Cultural values include those perceived community beliefs or attitudes in a given area, which provides a framework for each social group's unity. The communities along the project corridor value their pioneer roots and the history surrounding their settlement. Similar to the Nobles County communities, the establishment of the rail system assured settlement in this area of Minnesota would continue.

The communities of Wilmont, St. Killian, Chandler and Lake Wilson are all located within close proximity to the proposed 115 kV transmission line. The economy of these areas depends mostly on agricultural (livestock, poultry, dairy and grain) and manufacturing (fertilizer, motor vehicle parts, feeds and concrete) opportunities.

#### **6.3.3.8 Recreation**

Recreational opportunities along the West Route are focused on providing opportunities for local residents. Wilmont recreational opportunities are primarily targeted for the residents of Wilmont. A City park and ball field are venues available for recreational activities. Lake Wilson's most popular recreational activity is baseball. They have a local baseball team named the Lake Wilson Bisons.

Residents near the West Route have access to many WMAs. For a description of the recreational activities at the WMAs, please see Section 4.4.3.8. Table 32 identifies the WMAs within two miles of the route and the approximate distance to the West Route.

**TABLE 32**  
**WMA ALONG THE WEST ROUTE**

County	WMA	Distance to the Route (Miles)	Size (Acres)
Nobles	Bluebird Prairie	1.8	77.5
	Herlein-boote	0.5	561.0
Murray	Chandler	0.25	370.4
	Carlson	1.0	26.1
	Peters	2.0	72.6
	Leeds	1.5	153.9
	Salt & Pepper	1.7	99.4

**Public Services**

Please see Section 4.4.3.9 for a description of typical public services available townships and towns along the West Route.

**6.3.3.9 Impacts and Mitigation for West Route – Human Settlement**

**Commercial, Industrial, Residential Land Use**

All land uses crossed by the Interstate route have the potential to be impacted by the proposed route. Land Use impacts were determined using the LMIC International Coalition Land Use/Land Cover project information. Along the West Route, approximately 0.58 acres of agricultural land and 0.07 acres of grassland will be impacted permanently due to the construction of the transmission line (Appendix E). Temporary construction impacts will be approximately 97 acres, and is described in more detail in Appendix E.

Impacts to Land Uses were minimized by using single, steel poles, which will minimize impacts to agriculture, the primary land use along the route. The utilization of existing linear corridors also helps to minimize impacts to land uses along the route.

**Noise**

Please see Section 4.4.3.10 for a discussion on the impacts and mitigation regarding noise in the region.

**Aesthetics**

Aesthetics in this area will be changed since the 70 to 80 foot steel poles will be a contrast to the surrounding agricultural fields. However, these changes are not as visible in the long viewshed as are the wind turbines that have been constructed in the area. The newer wind turbines are

approximately three times as tall as the transmission lines and the new 115 kV transmission line will follow currently disturbed roadway corridors for 70 percent of the route.

Xcel Energy proposes to utilize existing corridors for the construction of the proposed route. The Company will be sensitive to owners' concerns and will work closely with landowners to minimize impacts to their viewshed where practicable.

### **Socioeconomics**

For a general description of socioeconomic impacts and mitigation measures in the region please see Section 4.4.3.10. A smaller number of workers will be required for the 115 kV line construction. Table 33 below outlines the estimated number of workers required for the West Route:

**TABLE 33  
ESTIMATED NUMBERS OF WORKERS FOR CONSTRUCTION  
OF THE 345 KV TRANSMISSION LINE**

Type of Work	Number of Employees	Comments
Land Rights	2	
Survey	2	
Construction – Foundations	6-8	
Construction – Poles	15-20	
Construction – Substation	8-12	
Office Personnel	4	Infrequent Visits

### **Recreation**

The line will likely be visible to individuals using recreational resources within two miles of the transmission line. No direct impacts are anticipated to WMA or WPA lands. Impacts to wildlife that utilize the WMAs along the West Route are possible. Please see Section 6.3.6.5 for a discussion of impacts to organisms that may be impacted.

## **6.3.4 LAND-BASED ECONOMIES**

### **6.3.4.1 Agriculture**

Murray County has strong economic ties to agriculture. It ranks among the top twenty counties in the state in oats, soybeans, corn, and cattle. According to the 2003 Minnesota Agricultural Statistics department, approximately sixty-three million dollars was earned in both crop and livestock sales in 2001. In 1997 the U.S. Census recorded an increase in the amount of land in

farms, the average size of farms and the market value of the agricultural products sold in the county.

Nobles County is a large producer of livestock and ranks sixth in numbers of hogs and pigs and twelfth in the number of cattle. Approximately \$98,316,000 in livestock sales occurred in 2001. The 2003 Minnesota Agricultural Statistics reports that Nobles County is ranked seventh in soybean production in the state. Approximately 185,700 acres of soybeans were harvested during the 2002 season. The 1997 Census of Agriculture indicates that the average size of farms in the county has increased slightly, however the number of full time farms and the amount of land in farms has decreased.

#### **6.3.4.2 Forestry**

Please see Section 4.4.4.2 for a description of impacts to forestry resources along the West Route.

#### **6.3.4.3 Tourism**

The Wilmont and Reading areas of Nobles County are primarily small farming communities. Amenities in the area cater to local residents. Visitors to this County are likely to visit the city of Worthington, approximately 15 miles from the Wilmont and Reading communities.

Lake Wilson and Chandler are located in Murray County. These small towns have a rich history based in agriculture and pioneer living. Lake Wilson in particular is a quaint town between the Murray County seat, Slayton, and Pipestone, Minnesota. Buffalo Ridge can be seen rising from the landscape near Lake Wilson. Buffalo Ridge has become a popular location for establishing wind farms and has inadvertently encouraged tourism in the area. Murray County has highlighted the wind farms near Chandler as a tourist attraction.

#### **6.3.4.4 Mining**

For a general description of geological resources in the area, please see Section 4.4.4.4.

According to MN/DOT county pit maps for Nobles and Murray Counties, two active gravel pits lie within a mile of the West Route corridor. The pits are located in Leota Township and just south of the city of Lake Wilson. One inactive gravel pit was identified nearby the active gravel pit in Leota Township. No rock quarries were documented along the proposed route.

#### **6.3.4.5 Impacts and Mitigation for West Route – Land-Based Economics**

##### **Agriculture**

Agricultural impacts are described in Section 4.4.4.5. The West Route will be routed along the county road ROW. Temporary construction impacts to agriculture are approximately 97 acres. Permanent impacts to agriculture are estimated at 0.58 acres. Appendix E describes the land use impacts for the route in more detail.

For a description of typical mitigative measures for agricultural impacts, please see Section 4.4.4.5. To ensure minimal permanent losses to farmland, the poles for the 115 kV line will be placed five feet from county and township road ROW (Figure 14).

#### **6.3.5 ARCHAEOLOGICAL AND HISTORIC RESOURCES**

Please see Section 4.4.5 for a brief regional prehistoric and historic-period context.

##### **6.3.5.1 Impacts and Mitigation for West Route – Archaeological and Historic Resources**

A search of the Minnesota State Historic Preservation Office (SHPO) database identified three historic architectural sites and seven archaeological sites within one mile of the proposed route. None of these sites are along the project route. The proposed project traverses Buffalo Ridge, which is listed on the State Register of Historic Places.

Xcel Energy sent a letter to the SHPO requesting a review of the proposed project for compliance with the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act. The SHPO responded that an archaeological survey of the project was not needed, however, an assessment of the impacts to Buffalo Ridge, a State Register listed property, was suggested. A copy of the response letter is attached in Appendix I.8.

No impacts to previously identified archaeological resources are anticipated. Archaeological probability along the West Route appears relatively low and no impacts are expected; therefore, no mitigation is needed. As for impacts to Buffalo Ridge as a State Register listed property, Xcel Energy feels that the general issue of assessing impacts from turbine facilities on the property and determining mitigation should be resolved between the SHPO and the EQB. Xcel Energy anticipates direction from the EQB with regard to impacts to Buffalo Ridge.

### 6.3.6 NATURAL ENVIRONMENT

#### 6.3.6.1 Air Quality

There are minimal air quality impacts associated with transmission line construction and operation.

The only potential air emissions from a transmission line result from corona and are limited. Corona can produce ozone and oxides of nitrogen in the air surrounding the conductor. Corona consists of the breakdown or ionization of air in a few centimeters or less immediately surrounding conductors. For a 115 kV transmission line, the conductor gradient surface is usually below the air breakdown level. Usually some imperfection such as a scratch on the conductor or a water droplet is necessary to cause corona. Ozone also forms naturally in the lower atmosphere from lightning discharges and from reactions between solar ultraviolet radiation and air pollutants such as hydrocarbons from auto emissions. The natural production rate of ozone is directly proportional to temperature and sunlight and inversely proportional to humidity. Thus, humidity (or moisture), the same factor that increases corona discharges from transmission lines, inhibits the production of ozone. Ozone is a very reactive form of oxygen and combines readily with other elements and compounds in the atmosphere. Because of its reactivity, it is relatively short-lived. The Project area presently meets all federal air quality standards.

#### 6.3.6.2 Water Quality

The West Route passes through the West Fork Des Moines major surface water watershed. Individual stream and ditch crossings are listed in Table 34. The third column of the table indicates whether the body of water crossed is identified as a public water on the PWI maps. Additionally, there are six PWI basins within two miles of the project corridor: the Groth WMA (37P) along segment EW1, Lake Wilson (81P), an unnamed basin (65P) southeast of Chandler approximately two miles east of segment W5, and three basins which are associated with the Chandler WMA (69P, 70P, 117P) along Segment W5.

The line will span up to 22 wetlands that are identified on the PWI or NWI maps in Appendix D along the West Route. Two wetlands outside of the project corridor are PWI wetlands: near Wilmont (59W) along Segment W2 and NE of St. Kilian (49W) east of Segment W4.

### 6.3.6.3 Flora

A majority of the vegetation surrounding the West Route corridor is agricultural land. Since this region is in an area that was historically prairie grassland, there is a good chance that there are prairie remnants in the region. For a description of the vegetation that historically could be found in the area, please see Section 4.4.6.3.

### 6.3.6.4 Fauna

The area surrounding the West Route is primarily agricultural. For a description of the fauna in this region of Minnesota, please see Section 4.4.6.4 and Appendix H.

**TABLE 34**  
**WATER CROSSINGS FOR WEST ROUTE**

Segment	Waterbody Name	Public Water
EW1	Unnamed Intermittent Stream	--
W3	Unnamed Tributary to Kanaranzi Creek	X
W3	Unnamed Tributary to Kanaranzi Creek	--
W5	Unnamed Tributary to Champepadan Creek (1)	X
W5	Unnamed Tributaries to Champepadan Creek (4)	--
W5	Unnamed Intermittent Stream (2)	--
W5	Unnamed Tributaries to Chanarambie Creek (3)	X
W5	Unnamed Intermittent Stream	X
W5	Unnamed Intermittent Stream	--
W6	Judicial Ditch 14	X
W6	Unnamed Tributary to Judicial Ditch 14	X
W6	Unnamed Tributary to North Branch Chanarambie Creek (2)	X

(#) – Number of crossings. May indicate multiple crossings of the same stream or several streams with the same description.

### 6.3.6.5 Impacts and Mitigation for West Route – Natural Environment

#### Air Quality

Conductor surface gradients, which are responsible for ozone generation, are much lower for 115kV lines than 345kV lines too low to predict ozone concentrations. Studies designed to monitor the production of ozone under transmission lines have generally been unable to detect any increase due to the transmission line facility. Given this, there will be no measurable impacts relating to ozone for the Project.

### **Water Quality**

During construction there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading and construction traffic. However, once the project is completed, it will have no impact on surface water quality.

Xcel Energy will maintain sound water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil and stabilizing restored soil. The Company will avoid major disturbance of individual wetlands and drainage systems during construction. This will be done by spanning wetlands and drainage systems where possible. Please see Section 4.4.6.5 for a description of methods to minimize impacts to wetlands if they cannot be spanned. However, this is not anticipated for the West Route.

### **Fauna**

Please see Section 4.4.6.5 for impacts and mitigation regarding fauna along the West Route.

## **6.3.7 EFFECTS ON RARE AND UNIQUE NATURAL RESOURCES**

The USFWS and the Minnesota DNR were contacted to identify state and federally listed threatened and endangered species within the project area. Their responses are attached as Appendix I.1-I.2 to I.9. The resources identified in their letters are not within one mile of the West Route, with the exception of Topeka shiners. These resources were identified using the DNR Natural Heritage Database that was purchased for the Project.

Many of the rare and unique resources identified along other portions of the Project are associated with remnants of prairie land, which were once abundant in this area of Minnesota. Any unidentified resources that would be encountered in the field would likely be prairie remnants or associated with these remnants. Approximately 99 percent of the prairie that was present in the State before settlement has been destroyed and one-third of Minnesota's endangered, threatened and special concern species are dependent on the fragments of prairie that remain.

### **6.3.7.1 Impacts and Mitigation for West Route – Effects on Rare and Unique Natural Resources**

No impacts to rare and unique natural resources are expected along the West Route. Please see Section 4.4.7.1 for a discussion regarding prairie remnants. No prairie remnants have been identified along the West Route.

### 6.3.8 UNAVOIDABLE ADVERSE IMPACTS

The unavoidable adverse impacts are (Table 35):

**TABLE 35  
IMPACTS AND MITIGATION – WEST ROUTE**

Resource	Impact	Mitigation
Noise	Temporary impact from construction activities on the land surrounding the poles and the access road used for construction.	Line routing was done to avoid areas with dense populations. The route will avoid homes to the greatest extent possible. Construction will be conducted consistent with local ordinances.
Land Use	Temporary impact from construction activities on the land surrounding the poles and the access road used for construction; Minor permanent impact from placement of poles.	Line routing was done to avoid areas with dense populations. The route will avoid homes and use existing linear corridors to the greatest extent possible. Additionally, individuals with the route on their land will be compensated through easement dollars.
Agriculture	Temporary impact from construction activities to crop cycle and physical impact to the land along the access road and around the poles; Minor permanent impact from placement of poles.	Impacts were minimized by using single pole structures, which only creates one obstruction for the landowners to farm around, and a majority of the poles will be adjacent to the road.
Aesthetics	There are no areas with significant visual importance that will be impacted by the transmission line. Minor visual impacts will occur in areas where poles will be placed. However, the wind turbines in the area are approximately three times taller than the proposed height for the 115 kV poles and present a greater visual impact.	Line routing was done to avoid areas with a large number of homes and to use existing linear corridors that are already disturbed.
Recreation	Visual impacts will occur to recreational areas near the proposed transmission line.	The use of existing disturbed corridors and avoiding direct impacts to these areas, particularly WMAs, was done when considering routing options for the transmission line.
Air	Temporary impacts will occur in the areas where Xcel Energy is actively constructing the transmission line.	Best management practices will occur during construction to minimize the amount of fugitive dust that is created.
Fauna	The possibility of birds colliding with the lines is possible, especially in areas of high use by waterfowl during migration.	Xcel Energy will work with the DNR to identify areas along the new transmission line where additional measures are needed to protect the wildlife that may be impacted. Measures may include swan flight diverters and the use of H-frame structures.

## 6.4 ROUTE E – EAST ROUTE

### 6.4.1 ROUTE DESCRIPTION

The East Route generally follows County and Township roads for the entire route and detailed route maps can be found in Appendix D and a route overview map is Figure 22. The route will be approximately 36.6 miles if Substation A or B were chosen. Substation C is not an option for the East Route. The segments for the East Route from Substations A and B include EW1, E2, E3, E4, and E5. Substation C uses AW1 and W2 to exit the substation and begin the route.

#### 6.4.1.1 East Route if Substation Sites A and B Selected

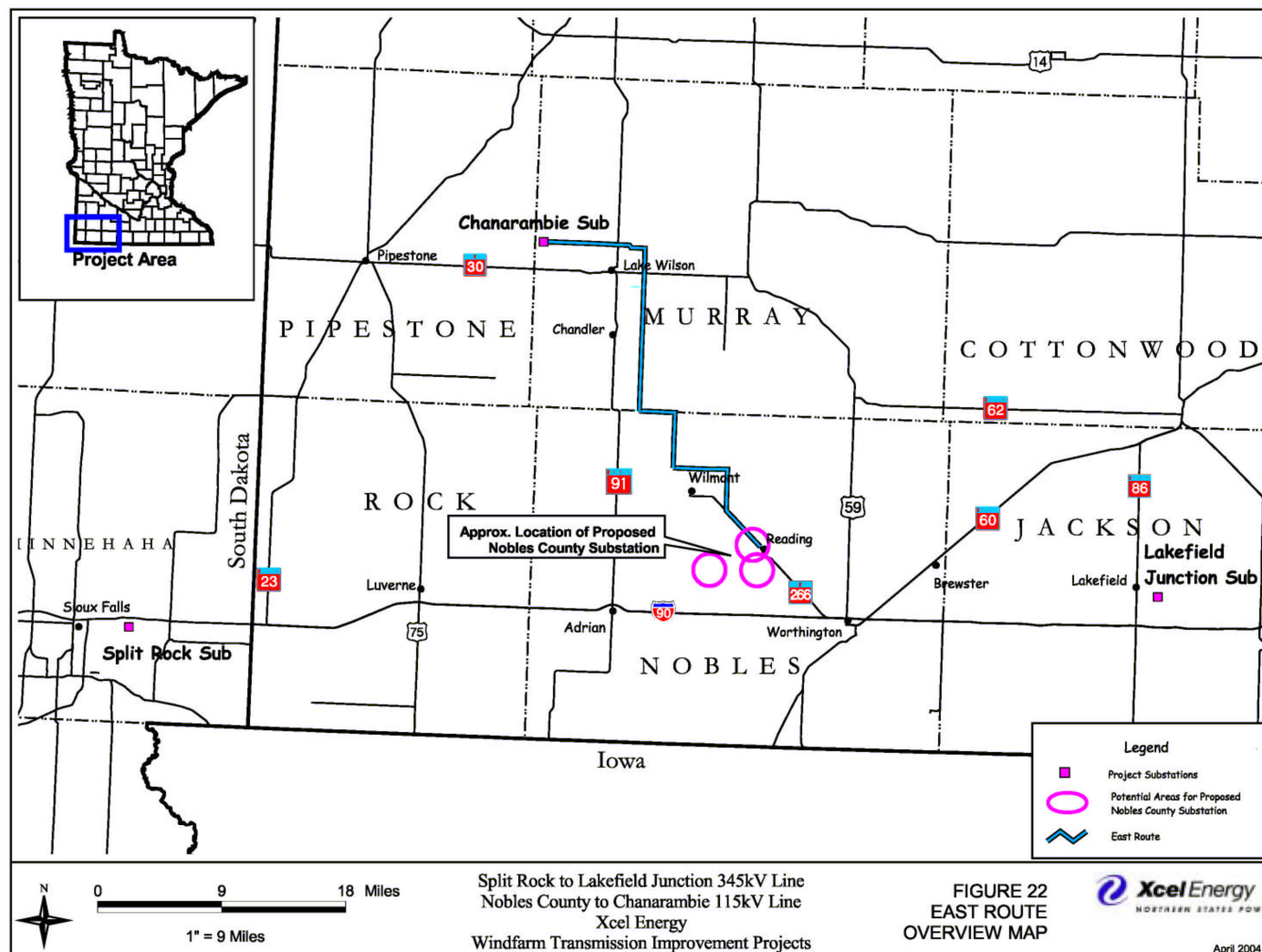
**EW1** follows Trunk Highway 266 northwest along the northeast side of the highway for 3.6 miles to the junction of T.H. 266 and King Avenue. The line crosses agricultural land along this segment of the route.

#### 6.4.1.2 Remainder of East Route

**E2** begins at the junction of T.H. 266 and King Avenue. The line would follow the west side of King Avenue north approximately three miles to the north side of 140<sup>th</sup> Street. The line turns west at 140<sup>th</sup> Street and crosses over from the north to the south side of the road approximately 3300 feet from the corner of 140<sup>th</sup> Street and King Avenue. This will avoid impacting homes along this segment and will distance the transmission line from the Einck WMA. The line continues to follow 140<sup>th</sup> Street until it reaches Erickson Avenue.

**E3** continues north along the east side of Erickson Avenue for four miles to County Road 72 at the Nobles and Murray County border. The line follows the south side of the County Road 72, west for 2.5 miles across agricultural land to 80<sup>th</sup> Avenue.

**FIGURE 22  
EAST ROUTE OVERVIEW MAP**



**E4** is nine miles in length. It begins at the junction of County Road 72 and 80<sup>th</sup> Avenue. The line will follow the east side of the road for approximately three miles, where it crosses to the west side of the road one mile north of CSAH 1. The line will continue for one mile along 80<sup>th</sup> Avenue, passing near Dierenfield WMA. At this point, 80<sup>th</sup> Avenue becomes CSAH 28. The line will continue to single circuit along the west side of CSAH 28 avoiding homes along the segment. The segment ends at the junction of 91<sup>st</sup> Street and CSAH 28 near the Carlson WMA and Lake Wilson Nobles Cooperative Substation.

**E5** continues along CSAH 28 for 3.3 miles, passing near Peters WMA. At this point, the line will turn east along the field margin. Xcel Energy would like flexibility in this section of the route to avoid impacting the homes at the corner of 80<sup>th</sup> Avenue and County Road 86/121<sup>st</sup> Street to avoid impacting two homes along 121<sup>st</sup> Street. The line will continue east along the south side of 121<sup>st</sup> Street road for approximately two mile. At TH 91 it will cross to the north side of the 121<sup>st</sup> Street. The line will run adjacent to the 121<sup>st</sup> Street ROW through agricultural fields. At 10<sup>th</sup> Avenue the line crosses to the south side of the road where it will double circuit with an existing 115 kV line for approximately 0.5 miles to Chanarambie Substation. Additionally, Xcel Energy requests the option of relocating the 115 kV transmission lines near Chanarambie substation to accommodate the new transmission line.

#### **6.4.2 DESCRIPTION OF ENVIRONMENTAL SETTING**

Please see Section 6.3.2 for a description of the environmental setting along the East Route. The elevation range is slightly different and ranges between 1620 and 1880 feet AMSL.

#### **6.4.3 HUMAN SETTLEMENT**

##### **6.4.3.1 Public Health and Safety**

Please see Section 6.3.3.1 for a discussion on Public Health and Safety applicable to this route alternative.

##### **6.4.3.2 Commercial, Industrial, Residential Land Use**

Land use along the East Route is primarily agricultural. In Nobles County, the line will run adjacent to areas zoned “Agricultural” throughout the route and Rural Residential (R-2) near the town of Reading. In Murray County, the line will cross areas zoned “Agricultural” and “Conservation.” Conservation districts are intended to protect environmentally sensitive, scenic areas; retain major areas of natural ground cover for conservation purposes; and deter the abuse of water resources and conserve other natural resources of the county.

**6.4.3.3 Displacement**

There are no homes that will be displaced as a result of the construction of the proposed line. There are approximately 24 homes within 300 feet of the East Route. The closest residence to the transmission line is 90 feet away.

**6.4.3.4 Noise**

Please see Section 4.4.3.4 for a background on noise and Minnesota regulations regarding noise. The closest residence to the East Route is 90 feet from the proposed route centerline.

**6.4.3.5 Aesthetics**

Please see Section 6.3.3.5 for a description of the poles and ROW that will be present along the East Route.

**6.4.3.6 Socioeconomic**

Please see Section 6.3.3.6 for a discussion of socioeconomics along the East Route.

**6.4.3.7 Cultural Values**

Please see Section 6.3.3.7 for a discussion of cultural values along the East Route.

**6.4.3.8 Recreation**

Please see Section 6.3.3.8 for a general description of recreational resources along the East Route.

Residents near the East Route have access to many Wildlife Management Areas (WMA). Table 36 identifies the WMAs within 2.0 miles of the route and the approximate distance to the East Route. Maps identifying WMAs and WPAs along the route are in Appendix D.

There is one WPA located along the East Route. The Scholten WPA is approximately 0.5 miles from segment E2.

**6.4.3.9 Public Services**

Please see Section 4.4.3.9 for a discussion of public services along the East Route.

**TABLE 36**  
**WMA ALONG THE EAST ROUTE**

County	WMA	Distance to the Route (Miles)	Size (Acres)
Nobles	Einck	0.0 <i>adjacent</i>	49.6
Nobles / Murray	Fenmont	1.0	276.1
	Scheuring	2.0	22.1
Murray	Cleanwater	2.0	34.8
	Gallinago	1.1	138.6
	Dierenfield	0.6	55.7
	Humphery	1.3	82.5
	Chandler	1.3	370.4
	Carlson	0.0 <i>adjacent</i>	26.1
	Peters	0.5	72.6
	Leeds	1.0	153.9

#### **6.4.3.10 Impacts and Mitigation for East Route – Human Settlement**

No impacts are anticipated to public health and safety, cultural values or public services. Additionally, no individuals will be displaced due to the construction of this project.

#### **Commercial, Industrial, Residential Land Use**

Please see Section 4.4.3.10 for a discussion of land use impacts and mitigation measures along the East Route.

#### **Noise**

Please see Section 4.4.3.10 for a discussion on the impacts and mitigation measures regarding noise in the region.

#### **Aesthetics**

Impacts and mitigative measures regarding aesthetics will be similar to those described in 4.2.3.10. However, the East Route utilizes existing corridors along 98 percent of the corridor.

#### **Socioeconomics**

Please see Section 4.4.3.10 for a discussion of socioeconomic impacts and mitigative measures.

### **Recreational Resources**

Recreational resources along the East Route that may be impacted are the Einck and Carlson WMAs. Both these properties are immediately adjacent to the East Route; however, currently the route is planned on the opposite side of the road. Therefore, no direct impacts to these lands are anticipated. Impacts to wildlife that utilize the WMAs along the East Route are possible. Please see Section 6.3.6.5 for a discussion of organisms that may be impacted.

#### **6.4.4 LAND-BASED ECONOMIES**

##### **6.4.4.1 Agriculture**

Please see Section 6.3.4.1 for a description of the Agricultural resources along the East Route.

##### **6.4.4.2 Forestry**

See Section 6.3.4.2 for a discussion of Forestry resources along the East Route.

##### **6.4.4.3 Tourism**

Please see Section 6.3.4.3 for a discussion of tourist destinations along the East Route.

##### **6.4.4.4 Mining**

For a description of geological resources in the area please see Section 4.4.4.4.

According to MN/DOT county pit maps for Nobles and Murray Counties, no active or inactive gravel pits exist within a mile of the East Route corridor. No commercial aggregate pits or rock quarries were identified.

#### **6.4.4.5 Impacts and Mitigation for East Route – Land-Based Economics**

##### **Agriculture**

Ag impacts are described in Section 4.4.4.5. The East Route will be routed along the County Road ROW. Temporary impacts are 101 acres for the East Route. Permanent impacts to agriculture are estimated at 0.61 acres. Appendix E describes the land use impacts for the route in more detail.

##### **Tourism**

Please see Section 6.3.4.5 for impacts and mitigative measures regarding tourism along the East Route.

#### **6.4.5 ARCHAEOLOGICAL AND HISTORIC RESOURCES**

Please see Section 4.4.5 for a brief regional prehistoric and historic-period context.

#### **6.4.5.1 Impacts and Mitigation for East Route – Archaeological and Historical Resources**

A search of the Minnesota State Historic Preservation Office (SHPO) database identified no historic architectural sites and three archaeological sites within one mile of the proposed route. None of these sites are along the project route. The proposed project traverses Buffalo Ridge, which is listed on the State Register of Historic Places.

Xcel Energy sent a letter to the SHPO requesting a review of the proposed project for compliance with the Minnesota Historic sites Act and the Minnesota Field Archaeology Act. The SHPO responded that an archaeological survey of the project was not needed, however, an assessment of the impacts to Buffalo Ridge, a State Register listed property, was suggested. A copy of the response letter is attached in Appendix I.8.

No impacts to previously identified archaeological resources are anticipated. Archaeological probability along the East Route appears relatively low and no impacts are expected; therefore, no mitigation is needed. As for impacts to Buffalo Ridge as a State Register listed property, Xcel Energy feels that the general issue of assessing impacts from turbine facilities on the property and determining mitigation should be resolved between the SHPO and the EQB. Xcel anticipates direction from the EQB with regard to impacts to Buffalo Ridge.

#### **6.4.6 NATURAL ENVIRONMENT**

##### **6.4.6.1 Air Quality**

Please see Section 6.3.6.1 for a description of air quality along the East Route.

##### **6.4.6.2 Water Quality**

The East Route passes through the West Fork Des Moines major surface water watershed. Individual stream and ditch crossings are listed in Table 37. The second column of the table indicates whether the body of water crossed is identified as a public water on the Public Waters Inventory Maps. Additionally, there are six PWI basins within two miles of the project corridor: the Groth WMA (37P) along segment EW1, Lake Wilson (81P), an unnamed basin (65P) southeast of Chandler approximately two miles east of segment W5, and three basins which are associated with the Chandler WMA (69P, 70P, 117P) along Segment W5.

The line will span up to nine wetlands that are identified on the PWI or NWI maps in Appendix D along the East Route. Two PWI wetlands outside of the project corridor are PWI wetlands: near Wilmont (59W) along Segment W2 and NE of St. Kilian (49W) east of Segment W4. One of the PWI wetlands (172W) is within the route corridor along segment E4.

**TABLE 37**  
**WATER CROSSINGS FOR EAST ROUTE**

Segment	Waterbody Name	Public Water
EW1	Unnamed Intermittent Stream	--
E2	Jack Creek	X
E2	Unnamed Tributary to Jack Creek (2)	--
E2	Unnamed Tributary to Jack Creek	X
E3	Unnamed Intermittent Stream	X
E3, E4	Unnamed Tributary to Champepadan Creek (2)	X
E3, E4	Unnamed Tributary to Champepadan Creek (2)	--
E4	Unnamed Intermittent Streams to Chanarambie Creek	X
E4	Unnamed Intermittent Stream	--
E4	Unnamed Tributary to Judicial Ditch 14	X
E5	Beaver Creek (2)	X
E5	Unnamed Tributary to County Ditch 20 (2)	--
E5	Unnamed Tributary to Beaver Creek	--
E5	Unnamed Tributary to Judicial Ditch 14	X

(#) – Number of crossings. May indicate multiple crossings of the same stream or several streams with the same description.

Table 38 summarizes the MPCA “2002 MN 305(b) Report to Congress of the United States” as it pertains to the water quality of the water bodies crossed by the proposed line.

**TABLE 38**  
**SURFACE WATER QUALITY ASSESSMENTS FOR THE EAST ROUTE**

Water Body	Aquatic Life	Swimming
Jack Creek	Not Assessed	Not Assessed
Beaver Creek	Not Assessed	Not Supported

#### 6.4.6.3 Flora

A majority of the vegetation surrounding the East Route corridor is agricultural land. Since this region is in an area that was historically prairie grassland, there is a good chance that there are prairie remnants in the region. For a description of the vegetation that historically could be found in the area, please see Section 4.4.6.3.

#### 6.4.6.4 Fauna

The area surrounding the East Route is primarily agricultural. For a description of the fauna in this region of Minnesota, please see Section 4.4.6.4 and Appendix H.

#### **6.4.6.5 Impacts and Mitigation for East Route – Natural Environment**

Please see Section 6.3.6.5 for a description of impacts and mitigative measures regarding air quality, water quality, flora, and fauna.

#### **6.4.7 EFFECTS ON RARE AND UNIQUE NATURAL RESOURCES**

The USFWS and the Minnesota DNR were contacted to identify state and federally listed threatened and endangered species within the project area. Their response is attached as Appendix I.1 - I.2 and I.9. The resources identified in their letters are not within one mile of the East Route, with exception of Topeka shiners. These resources were identified using the DNR Natural Heritage Database that was purchased for the Project.

As stated in previous sections, prairie fragments may be present along the East Route.

##### **6.4.7.1 Impacts and Mitigation for East Route – Effects on Rare and Unique Natural Resources**

No impacts to rare and unique natural resources are expected along the East Route. If prairie fragments are identified, impacts to these fragments will be avoided. Please see Section 6.3.7.1 for mitigative measures for rare and unique natural resources.

#### **6.4.8 UNAVOIDABLE ADVERSE IMPACTS – EAST ROUTE**

The Unavoidable Adverse Impacts along the East Route are generally the same as Section 6.3.8.

### **6.5 PREFERRED ROUTE**

In determining whether to issue a permit for a high voltage transmission line, the EQB considers 14 factors, which are listed in Minnesota Rule 4400.3150. A discussion of each of the relevant factors for the West Route and the East Route are provided side by side in Table 39.

The deciding factors in selection of the East Route as the preferred route are as follows:

- ◆ The cost of the East Route is \$2 million less than the West Route.
- ◆ The area around Chanarambie Substation has become congested with transmission and distribution lines due to wind development in the area. Routing into the substation along the East Route is much easier from an engineering perspective than along the West Route. Also, the addition of another transmission line further burdens property owners near the substation, who currently have multiple 34.5 kV lines on their land.

- ◆ The West Route would enter the Chanarambie substation from the south, through a field containing many wind turbines. Potential conflicts can be avoided by utilizing the East Route, where potential conflicts would only arise near the Chanarambie substation.
- ◆ New ROW along the East Route would be needed for one mile of the entire route, whereas the West Route would require approximately 7.4 miles of new ROW.

**TABLE 39**  
**FACTORS CONSIDERED FOR THE NOBLES COUNTY TO CHANARAMBIE 115 KV ROUTE**

Factor	East (to Substation A)	West (to Substation A)	Lesser Impacts
<b>Effects on human settlement and aesthetics</b>			
<b>Displacement</b>	None	None	----
<b>Noise</b>	Noise levels will be within state standards and below background levels.	Same	----
<b>Aesthetics</b>	Poles and lines will affect viewscape. However, 98% of the route will follow existing disturbed corridor, including an area dominated by wind turbines that are approximately three times taller than power lines. Line will potentially impact 24 homes.	Poles and lines will affect viewscape. However, 70% of the route will follow existing disturbed corridor, including an area dominated by wind turbines that are approximately three times taller than power lines. Line will potentially impact 25 homes.	East
<b>Cultural Values</b>	None	None	
<b>Recreation</b>	There will be visual impacts to WMAs. The impacts will be greater than those of West Route because the East Route is nearer to WMAs.	There will be minimal visual impacts to WMAs. Route will be located approximately ¼ mile from WMA.	West
<b>Public Services</b>	None	None	
<b>Socioeconomic</b>	Minimum positive short-term-effects from construction activities to local economy expected.	Same	----
<b>Effects on public health and safety</b>	None	None	----
<b>Effects on land-based economies</b>	Pole placement will impact farmland throughout the corridor. Temporary impacts, including soil compaction and crop damages are also likely. Temporary impacts expected to affect 101 acres of land. Permanent impact area estimated at 0.61 acres of agricultural land and 0.05 acres of grassland.	Pole placement will impact farmland throughout the corridor. Temporary impacts, including soil compaction and crop damages are also likely. Temporary impacts expected to affect 97 acres of agricultural land. Permanent impact area estimated at 0.58 acres of agricultural land and 0.07 acres of grassland.	West
<b>Effects on archeological and historic resources</b>	None	None	

Factor	East (to Substation A)	West (to Substation A)	Lesser Impacts
<b>Effects on the natural environment</b>			
<b>Air</b>	There will be no measurable impacts relating to ozone. Temporary air quality impacts will be caused by construction-related emissions.	Same	
<b>Water</b>	Temporary impacts to wetlands may occur if necessary for crossing.	Same.	----
<b>Flora/Fauna</b>	Nominal impacts are expected to flora given that the majority of the route follows an already altered landscape. Impacts to fauna possible (line collision).	Same.	----
<b>Effects on rare and unique natural resources</b>	None	None	
<b>Application of design options that maximize energy efficiencies, mitigate adverse environmental effects and could accommodate expansion of transmission capacity</b>	Xcel Energy will work with the affected landowners to use a design that mitigates the impact on the affected landowners and the ROW. Use of bundled conductors will enable more wind generators to interconnect to the grid along the 115kV line. However, there are known, or likely plans to add additional transmission capacity along the proposed route. Therefore, the design is appropriate to this project and maximizes energy efficiency.	Same	
<b>Use or paralleling of existing rights-of-way, survey lines, natural division lines and agricultural field boundaries</b>	Wherever possible line will follow existing rights-of-way, survey lines and agricultural field boundaries. Refinements will be made during construction with input from landowners.	Same	----
<b>Use of existing large electric power generating plant site</b>	Not applicable	Not applicable	
<b>Use of existing transportation, pipeline and electrical transmission systems or rights-of-way</b>	Route will follow transportation transmission, and other rights-of-way for all but one mile.	Route will follow transportation transmission, and other rights-of-way for all but 7.4 miles.	East
<b>Electrical system reliability</b>	Line and route designed to provide reliable outlet capability to Buffalo Ridge.	Same.	

Factor	East (to Substation A)	West (to Substation A)	Lesser Impacts
<b>Costs of constructing, operating and maintaining the facility which are dependent on design and route</b>	Construction costs are estimated at \$13,450,000.	Construction costs are estimated at \$15,460,000.	East
<b>Adverse human and natural environmental effects which cannot be avoided</b>	The unavoidable impacts to human and natural environment are minimal. Construction related activities would cause short-term impacts, mainly in the form of disturbed soils. Long-term, the installation of poles and conductors along the proposed route will create aesthetic impacts that cannot be avoided.	Same	----
<b>Irreversible and irretrievable commitments of resources</b>	The proposed route does not require any irreversible or irretrievable commitment of resources. If the line were removed in the future, the land could be restored to its prior condition and put to a different use.	Same	----

## **7.0 AGENCY INVOLVEMENT, PUBLIC PARTICIPATION AND REQUIRED PERMITS AND APPROVALS**

### **7.1 AGENCY CONTACTS**

Refer to Appendix I for agency correspondence letters. The following Minnesota agencies were contacted for their input on the Project:

#### **7.1.1 MINNESOTA DEPARTMENT OF NATURAL RESOURCES**

The Minnesota DNR Natural Heritage and Non-game Research Program was contacted to provide comments on the Project area related to the State threatened and endangered species and rare natural features identified in the project area. The DNR commented on the importance of avoiding impacts to native prairie fragments. They also commented on avoiding impacts to Topeka shiners (*Notropis Topeka*). Additionally, a license was acquired to use data from the DNR's Natural Heritage Information System for this project (Appendix I.1- I.2).

Xcel Energy has worked closely with the Minnesota DNR, Region 4 to obtain comments on the proposed Project. On June 11, 2003, the Company met with the Minnesota DNR Wildlife Mangers and the Environmental Assessment Ecologist that manage the lands along the route. Written comments provided by the Environmental Assessment Ecologist (see Appendix I.3-I.7) included an identification of the DNR's preferred route for the 345 kV and 115 kV transmission lines. The DNR also recommended using flight diverters in close proximity to WMAs, lakes, rivers, and wetlands. The letter also included a discussion on protection of Topeka shiners, northern cricket frogs and native prairie.

As stated throughout this application, Xcel Energy will attempt to avoid sensitive resources such as native prairie fragments. Xcel Energy always spans streams and rivers so streams known to inhabit Topeka Shiners will not be impacted. Additionally, Xcel Energy will consult with the DNR to identify areas where measures may be necessary to protect waterfowl near the WMAs, lakes, rivers and wetlands in the region.

#### **7.1.2 MINNESOTA SHPO**

The Minnesota SHPO was contacted to review and comment on the proposed project for compliance with Minnesota Rules 4400.1150, Subpart 3D regarding the effects of the proposed project on archaeological and historic resources. Appendix I.8 has a copy of the response. Two distinct issues were identified by the SHPO. First, an archaeological survey was not recommended for the project corridor. Second, the SHPO commented in the following

manner: "...Buffalo Ridge, which is listed in the State Register of Historic Places, is located in the project area. An assessment of effects to this property needs to be completed." An informal phone discussion between an Xcel consultant and SHPO representatives confirmed that this statement has been previously misinterpreted as an archaeological resources issue rather than one of historical geography or traditional cultural place.

Xcel Energy believes that this statement and the recommendations are beyond the scope of this project application and one that likely requires resolution on an agency level between the EQB and the SHPO. To the extent the SHPO comment may be relevant to this specific project, we believe the information presented in the application does represent an accurate assessment of this Project's impacts to Buffalo Ridge. Overall, Xcel Energy believes these impacts are reasonable given the benefits that will accrue from development of additional wind energy. If the SHPO is driven by concerns relative to future development on the Ridge, i.e., more wind turbines, Xcel Energy believes it is important to note that the Minnesota Legislature has mandated much of the existing wind energy development in Minnesota. Most of this development has occurred in southwestern Minnesota due to its favorable wind regime. Xcel Energy believes SHPO's concerns about future development of wind energy development in the Buffalo Ridge area is best considered in a forum which addresses state policy on wind development.

### **7.1.3 USFWS**

The USFWS, Twin Cities Field Office responded on August 13, 2003 regarding potential effects to federally threatened and endangered species along the proposed routes (Appendix I.9). The USFWS, Twin Cities Field Office stated, "Given the locations provided (Township, Range and Sections) and type of activity proposed, we have determined the project is not likely to adversely affect any federally listed or proposed threatened or endangered species or adversely modify their critical habitat."

On June 7, 2002, Ecological Service of the USFWS in South Dakota identified their concerns regarding the proposed project. Xcel Energy addressed these concerns in a letter dated July 2, 2003. Additionally, the USFWS was asked to provide any additional comments the agency may have regarding federally-listed threatened or endangered species within the project area. The USFWS did not respond to the July 2003 letter. Xcel Energy will contact them again prior to filing for the South Dakota Public Utilities Commission Permit.

#### **7.1.4 MN/DOT, DISTRICT 7**

No response was received in relation to our July 2, 2003 letter. However, Xcel Energy has met with representatives of MN/DOT for this area several times in conjunction with issues associated with the Lakefield Junction to Fox Lake Route Application. MN/DOT has been receptive to sharing corridor along this route. Generally Xcel Energy will route around interchanges, however there may be cases where Xcel Energy will need to route through interchanges and place poles on MN/DOT ROW. The Company will coordinate closely with the MN/DOT to minimize impacts.

#### **7.1.5 MN/DOT, DISTRICT 8**

MN/DOT, District 8 was contacted on July 2, 2003 to provide them with an opportunity to comment on the proposed project. MN/DOT provided four comments in relation to the project:

- ◆ A long form permit will be required if State right-of-way is involved.
- ◆ Poles must meet clear zone distance.
- ◆ Poles on State right-of-way will be placed within 1 to 3 feet of the right-of-way line.
- ◆ The applicant and/or contractor will prevent vehicles from carrying mud on to the highway.

They concluded that the transmission line crossings should have minimal impact on State right-of-way. Their comments are included as Appendix I.10.

#### **7.1.6 TRIBAL GROUPS**

When projects require Federal permits, contacts with tribes are done to comply with Section 106 of the National Historic Preservation Act of 1966 (and its amendments) and 36 CFR 800, procedures on the Advisory Council on Historic Preservation. There are no Federal permits anticipated for this Project, but a courtesy contact was made to solicit comments. The following entities representing tribes with interests within the Project area were contacted to obtain comments in relation to the Project:

- ◆ Flandreau Santee Sioux Executive Committee
- ◆ Lower Sioux Indian Community Council, Lower Sioux Indian Comm. of Minnesota
- ◆ Prairie Island Community Council, (Minnesota Mdewakanton Sioux)

- ◆ Santee Sioux Tribe of Nebraska
- ◆ Sisseton-Wahpeton Dakota Nation
- ◆ Spirit Lake Tribal Council
- ◆ Upper Sioux Community of Minnesota
- ◆ Yankton Sioux Tribal Business & Claims Committee
- ◆ Yankton Sioux Tribe

No comments were received in relation to the Project.

#### **7.1.7 MINNESOTA POLLUTION CONTROL AGENCY**

The Minnesota Pollution Control Agency was contacted August 25, 2003, to provide input on the Project. No comments were received.

#### **7.1.8 MINNESOTA DEPARTMENT OF AGRICULTURE**

The Minnesota Department of Agriculture was contacted August 25, 2003, to provide input on the Project. No comments were received.

#### **7.1.9 SOUTH DAKOTA GAME FISH AND PARKS**

The South Dakota Game, Fish and Parks (GFP) was initially contacted in April of 2002 to review the Project for rare, threatened and endangered species. There were 14 occurrences within the project area. The GFP was contacted again on July 2, 2003 to provide any additional comments that they may have. In a letter dated July 29, 2003, the GFP reaffirmed the 14 occurrences identified in their original letter and also identified a bald eagle nest site (Appendix I.11). In this letter the agency also discussed their concerns in relation to wetland impacts. These issues will be addressed in consultation with GFP and in Xcel Energy's filing with the SD PUC.

#### **7.1.10 SOUTH DAKOTA STATE HISTORICAL SOCIETY**

The South Dakota State Historical Society was contacted to review the proposed project for effects to archaeological and historic properties. The SHPO responded with information on 10 historic properties (Appendix I.12). In summary, seven properties are eligible for listing in the National Register of Historic Places (NRHP), two are not eligible, and one is listed on the State Register of Historic Places. The SHPO provided no additional comment.

#### **7.1.11 SOUTH DAKOTA ARCHAEOLOGICAL RESEARCH CENTER**

The South Dakota Archaeological Research Center was contacted to conduct an archaeological site record search for areas within a one mile radius of the proposed project alignments. One eligible historic period linear feature and one potentially eligible prehistoric archaeological site were identified in very close proximity of the proposed alignments. Twenty-four cultural resources were identified within a one mile radius of the proposed project alignments. One resource, the Chicago and Northwestern Railroad, is eligible for listing in the NRHP and five cultural resources are not eligible for listing in the NRHP. The remaining 19 resources are potentially eligible for listing in the NRHP. Center staff concluded their letter with a comment that a lack of previously identified cultural resources in a given area does not absolve the need for a field inventory by a qualified archaeologist. Xcel Energy will work with Center staff to address this issue prior to filing the application with the SD PUC.

#### **7.1.12 SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION, SIOUX FALLS AREA OFFICE**

The South Dakota Department of Transportation identified future construction projects that may be impacted by the location of the transmission line. They also identified necessary right-of-way permits required for the proposed project (Appendix I.12).

### **7.2 PUBLIC PARTICIPATION**

#### **7.2.1 INFORMATIONAL MEETINGS**

Xcel Energy conducted four public meetings prior to submission of the route permit application, in July 2003. Meetings were conducted in the towns of Worthington, Lake Wilson, and Luverne, Minnesota and in Brandon, South Dakota. Another meeting was held in Wrothington in August 2003. These meetings were designed to get input on the proposed routes and other issues of concern. The primary concern raised by landowners was Xcel's initial proposal to parallel the existing 161 kV lines. As noted previously in the Application, Xcel Energy assessed this issue and modified its proposal to address this concern. The mailings for the meetings and summaries of comments raised by landowners and others who attended the meetings are provided in Appendix J.

Minnesota Rules, parts 4400.0200 through 4400.0800 lay out the process for obtaining a route permit for a transmission line from the EQB. The EQB will also provide a public advisor to assist citizens in participating effectively in the process.

The EQB staff will hold at least two informational meetings in the vicinity of the proposed route for the transmission line. The first set of meetings must be held less than 60 days following the route application acceptance. This meeting is intended to explain the siting process, to hear public concerns that should be addressed, and to respond to public questions.

In the interim period between meetings, the EQB staff reviews the application to determine the scope and time frame for the Environmental Impact Statement (EIS). Once this is determined, the EQB prepares the EIS. Upon document completion, a public hearing will be held to allow review of the EIS and to accept public questions and comments. A public comment period will be open for at least 10 days while the public and agencies review the EIS and submit written comments. Within 60 days of receipt of the public hearing record, the EQB Board will make its final decision in regard to the routing application. Once the final decision is issued by the EQB Board, a route permit is issued along with any appropriate conditions.

#### **7.2.2 CITIZENS ADVISORY TASK FORCE**

The EQB has the authority under Minnesota Rules 4400.1600, Subp. 1 to designate a Citizens Advisory Task Force (CATF). The task force is advisory and provides input to the MEQB in evaluating the Route Permit Application and in determining the scope of the Environmental Impact Statement (EIS) and route selection. With Xcel Energy's support, the EQB chair designated a CATF for this project on March 25, 2004 (Appendix K).

The Task Force must include local representation as outlined in Minn. Stat. 116C.59. Members of the task force will include individuals from the following governmental units:

- ◆ The Southwest Regional Development Commission
- ◆ Rock, Nobles, Jackson, and Murray Counties
- ◆ The City of Worthington
- ◆ The City of Luverne
- ◆ The City of Lakefield
- ◆ The City of Chandler
- ◆ One or more Town Board members from each of Rock, Nobles, Murray and Jackson Counties

Additionally, the CATF will include citizens who live, work or own property on or near any of the proposed routes. The CATF will not contain more than 18 members.

The following outlines the responsibility of the task force as identified by the EQB in its “Citizen Advisory Task Force Decision and Scope of Participation,” In the Matter of A Pending Application By Xcel Energy For Route Permits For A New 345 kV High Voltage Transmission Line And A New 115 kV Transmission Line in Southwest Minnesota:

Citizen Advisory Task Force members will assist the MEQB and MEQB staff to determine (1) whether important information is missing or inaccurate in the Xcel Energy route-permit application; (2) what impacts and issues of local concern should be assessed in the environmental impact statement; and (3) whether there are transmission-line routes or substation locations besides those proposed in the application that may maximize positive impacts, and minimize or avoid negative impacts, of the HVTL projects. Task Force member will advise MEQB staff on a proposed scoping document that will define the impacts and potential routes to be addressed in the environmental impact statement for the project. Task Force members are expected to participate with MEQB staff in up to four working Task Force meetings to help facilitate the duties listed above. The Task Force will expire upon completing the above assignment or 60 days after the application is accepted, whichever occurs first.

### **7.2.3 IDENTIFICATION OF LANDOWNERS**

Landowner names are provided in Appendix L. A total of approximately 941 landowners have been identified to be potentially impacted by one or more of the proposed routes and substation sites included in the application.

## **7.3 PERMITS THAT MAY BE REQUIRED**

Table 40 shows the permits potentially required for the Project. Xcel Energy will acquire the permits listed above once the Project route is approved by the EQB and the line design is complete.

**TABLE 40**  
**PERMITS THAT MAY BE REQUIRED**

Permit	Jurisdiction
<b>Local Approvals</b>	
Road Crossing Permits	County, Township, City
Lands Permits	County, Township, City
Building Permits	County, Township, City
Over-width Loads Permits	County, Township, City
Driveway/Access Permits	County, Township, City
<b>State of Minnesota Approvals</b>	
Route Permit Application	EQB
Utility Permit (highway crossings)	MN/DOT
License to Cross Public Waters	MN-DNR Division of Lands and Minerals
NPDES Permit	MPCA
<b>State of South Dakota Approvals</b>	
SD PUC Permit	SD PUC
Permit to Occupy ROW	SD Department of Transportation
NPDES Permit	SD Department of Environment and Natural Resources/Surface Water Quality Program
<b>Federal Approvals</b>	
Section 404 Approval	U.S. Army Corps of Engineers

### 7.3.1 LOCAL APPROVALS

#### Road Crossing Permits

These permits may be required to cross or occupy county, township, and city road ROW.

#### Lands Permits

These permits may be required to occupy county, township, and city lands such as park lands, watershed districts, and other properties owned by these entities.

#### Building Permits

These permits may be required by the local jurisdictions for substation modifications and construction.

#### Over-width Loads Permits

These permits may be required to move over-width loads on county, township, or city roads.

**Driveway/Access Permits**

These permits may be required to construct access roads or driveways from county, township, or city roadways.

**7.3.2 STATE OF MINNESOTA APPROVALS****Route Permit**

A HVTL cannot be constructed without a route permit approved by the EQB.

**Utility Permit**

A permit from the MN/DOT is required for construction, placement, or maintenance of utility lines that occur adjacent or across the highway ROW. These permits will be acquired once the line design is completed.

**License to Cross Public Waters**

The Minnesota DNR Division of Lands and Minerals regulates utility crossings over, under, or across any state land or public water identified on the Public Waters and Wetlands Maps. A license to cross Public Waters is required under Minnesota Statue, Section 84.415 and Minnesota Rules, Chapter 6135. Xcel Energy works closely with the DNR on these permits and will file for them once the line design is complete.

**NPDES Permit**

A National Pollutant Discharge Elimination System (NPDES) permit is required for storm-water discharges associated with construction activities disturbing equal to or greater than one acre. A requirement of the permit is to develop and implement a Storm-water Pollution Prevention Plan (SWPPP), which includes Best Management Practices (BMPs) to minimize discharge of pollutants from the site. This permit will be acquired since the construction will cause a disturbance of greater than one acre for the whole of the project and also at each substation site, approximately 15 acres will be disturbed. A SWPPP will only be required for the new Nobles County substation and the Split Rock Substation expansion. The other substations are existing and the transmission line will not cause impacts to surface water quality once it is operational.

**7.3.3 STATE OF SOUTH DAKOTA APPROVALS****South Dakota Public Utilities Commission Permit**

A transmission line cannot be constructed without a route permit from the Public Utilities Commission. A permit will be applied for as outlined in South Dakota Codified Law 49-41B-11

later this year. The SD PUC only requires one route to review and approve (or reject). The SD PUC has requested that Xcel Energy file for the one route they want the PUC to approve, which will be determined once Minnesota approvals have been received. Xcel Energy will continue to consult with SD PUC staff on the project. Xcel Energy would also support any measures the EQB may undertake to coordinate with the SD PUC.

#### **Permit to Occupy the Right-of-Way**

This permit is required by the South Dakota Department of Transportation and is required for Xcel Energy to gain access to their work site for the Interstate right-of-way. Xcel does not anticipate needing access to the I-90 ROW, but in the event that it is necessary, the Company will work closely with the SD Department of Transportation in acquiring this permit.

#### **NPDES Permit**

Please see Minnesota NPDES permit requirements.

### **7.3.4 FEDERAL APPROVALS**

#### **Section 404 Approval**

Approval under Section 404 of the Clean Water Act is required for projects that discharge temporary or permanent fill within the ordinary high water mark of a Water of the U.S. or within wetlands. At this time, Xcel Energy does not anticipate requiring this permit.

Xcel Energy will acquire the permits listed above once the Project route is approved by the EQB and the line design is complete.

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## 9.0 DEFINITIONS

Archaic	A time frame in North American pre-history spanning 7,000 years between 10,000 before present to 3,000 years before present, after Paleoindian and before Woodland times.
Avian	Of or relating to birds.
Calcareous	Containing calcium carbonate.
Conductor	A material or object that permits an electric current to flow easily.
Corona	The breakdown or ionization of air in a few centimeters or less immediately surrounding conductors.
Cretaceous	The third and latest period of the Mesozoic Era, occurring from 65 to 135 million years ago.
Crystalline	A general term for igneous and metamorphic rocks, as opposed to sedimentary.
End moraine	Moraine marking the terminal position of a glacier.
Fauna	The collective animals of any place or time that live in mutual association.
Flora	The collective plants of any place or time that live in mutual association.
Forb	A small, upright soft-stemmed or non-woody plant with broadleaves; the growth form of many common wildflowers.
Glaciation	Involving glaciers and moving ice. Usually pertaining to processes associated with glaciers.
Granitic	Of, pertaining to, or composed of granite or granite-like rock.

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Ground moraine	The material deposited from a glacier on the ground surface over which the glacier has moved.
Hydrocarbons	Compounds that contain carbon and hydrogen, found in fossil fuels.
Igneous	Rock formed by solidification from a molten or partially molten state.
Ionization	Removal of an electron from an atom or molecule.
Mesic	Of sites or habitats characterized by intermediate moisture conditions, i.e. neither decidedly wet nor decidedly dry.
Metamorphic	A rock that has been formed in the solid state from changes in temperature, pressure or chemical environment.
Mississippian	A cultural period of the southeastern North American Aborigine Indians dating from 1,300 to 400 before present.
Moraine	Drift deposited by glaciers.
Oxide	A compound of oxygen with one other more positive element or radical.
Ozone	A form of oxygen in which the molecule is made of three atoms instead of the usual two.
Paleoindian	A cultural period of the North American Aborigine Indians defined as 40,000 to 12,000 years before present.
Precambrian	The first segment of geologic time, extending from the creation of Earth (4.5 billion years ago) to the appearance of the first animals (543 million years ago). The Precambrian represents about 88 percent of Earth's history.
Quartzite	A granulose metamorphic rock consisting primarily of quartz.

Raptor	A member of the order Falconiformes, which contains the diurnal birds of prey, such as the hawks, harriers, eagles and falcons.
Riparian	Pertaining to the banks of a body of water.
Scientific and Natural Area	A program administered by the DNR with the goal to preserve and perpetuate the ecological diversity of Minnesota's natural heritage, including landforms, fossil remains, plant and animal communities, rare and endangered species, or other biotic features and geological formations, for scientific study and public edification as components of a healthy environment.
Shale	A fissile rock that is formed by the consolidation of clay, mud, or silt, has a finely stratified or laminated structure, and is composed of minerals essentially unaltered since deposition.
Ultraviolet radiation	A portion of the electromagnetic spectrum with wavelengths shorter than visible light.
Voltage	Electric potential or potential difference expressed in volts.
Waterfowl Production Area	Federally managed wetlands and surrounding uplands are open to hunting and wildlife watching. These lands are purchased and managed by the U.S. Fish and Wildlife Service to provide high quality wetlands and nesting cover for waterfowl and other species of wildlife.
Watershed	The area contained within a drainage divide.
Wetland	Wetlands are areas that are periodically or permanently inundated by surface or ground water and support vegetation adapted for life in saturated soil. Wetlands include swamps, marshes, bogs and similar areas.

Wildlife Management Area	Wetlands, uplands, or woods owned and managed for wildlife by the Department of Natural Resources (DNR). WMAs are managed for wildlife production and are open to the public for hunting and wildlife watching.
Woodland	A cultural period of the Eastern North American Aborigine Indians dating from 3,000 - 1,300 before present.

## Appendix A

### CON Order

## **Appendix B**

### **345 kV Maps**

## Appendix C

### Substation Maps

## Appendix D

### 115 kV Maps

## Appendix E

### Impacts Tables

## **Appendix F**

### **Zoning Information**

## **Appendix G**

### **Land Use Definitions**

## Appendix H

### Fauna List

## **Appendix I**

### **Agency Letters/Public Comments**

## Appendix J

### Public Meetings and Comments

## Appendix K

### CATF Order

## **Appendix L**

### **Landowner Names**